# MARINE REVIEW.

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## Summary of Lake Freight Conditions.

A season of navigation running well into December has enabled soft coal shippers to forward enough coal to the northwest to insure a full winter's supply. It is quite probable, in fact, that with the enormous shipments of the present month, it will be found, when the season's figures are complete, that the movement of coal, notwithstanding the long delay caused by the strike, will be fully equal to that of 1896. But the requirements called for more soft coal than was moved last year, and there is a great deal of satisfaction, both to the coal interests and the vessel owners, in knowing that docks at upper-lake ports will certainly be cleaned up in the spring. In order to move a sufficient supply of coal, shippers have been forced to pay rates that have been quite profitable to the vessels, but all things considered, the coal men are probably congratulating themselves on their success in holding rates down to 75 cents on coal going to the head of Lake Superior and 65 cents to Lake Michigan ports, which were the rates governing the great bulk of shipments during the past two or three weeks. On some coal moved from Sandusky, where both harbor facilities and coal loading plants are poor, these rates were exceeded, a dollar being paid to Lake Superior and as high as 87½ cents to Lake Michigan ports, but these charters were exceptional.

Immediately following the resumption of coal shipments after the strike had been settled, the managers of coal and ore railways that lead from Lake Erie into the iron manufacturing and coal producing districts of Ohio and Pennsylvania began to favor the coal interests, by drawing upon supplies of cars everywhere in which to move coal. Great numbers of cars were returned empty from the lakes, and the ore shippers, as well as the managers of iron furnaces, were informed that as they had full advantage of the car supply during the summer they were expected to give way in a large measure to the coal movement. In some cases the scarcity of cars for moving ore interfered very seriously with the management of furnaces and ore docks, and a great deal of unpleasantness arose between these interests and the railway managers. It was charged that some of the railway officials were interested in coal properties and were using their positions to favor such interests. Threats of directing public attention to charges of this kind were made, but now that the difficulties are practically at an end, the matter will probably blow over, as such charges would be hard to prove anyhow.

With the exception of the flurry caused by a 5-cent rate on a few closing cargoes of wheat from Fort William to Buffalo (equal to about $1.85 a ton on ore), there is little interest left in the freight market of the present season. Even this rate, tempting as it is, has been passed over by most vessel owners, as they have in mind the experience of ships that were caught in the ice at Fort William a year ago, and which sustained, in addition to delay and expense fitting out the following spring, losses of $2,500 to $3,500, on account of cargoes that they had missed and on account also of the further expense of shipping crews back and forth. The discussion of prospects for another season is now more interesting. There is assurance of a very large coal movement in 1898, and the ore dealers have made figures proving conclusively, on most conservative estimates, that the present consumption of ore in furnaces throughout the country will demand an output of full 14,000,000 gross tons in 1898, or about 2,000,000 tons in excess of the shipments of the present season. In view of this outlook, preparations are already being made in the Lake Superior mining region for the accumulation of big stock piles—miners' wages being increased at several of the large properties—but it is agreed in most cases that, although prospects are encouraging, plans for another year's operations are as yet a little premature. The lead pencil, even in the hands of experts among the ore dealers, has often been found deceiving when applied in the active fall period to the future demands of the iron industry. Even now conditions in the iron market are generally less encouraging than they were a few weeks ago, but this may be attributed in part to the usual dullness during the closing month of the year.

Among the ship builders there is little hope of more contracts just now for ordinary freight carriers. The leading yards, with one or two exceptions, have about all the new work they can handle until spring, and those that are not fully engaged would not be able to get material from the manufacturers of steel in time to turn out a large vessel before July or August of next year. It is quite probable, however, that within a few days the Buffalo management of lake interests of the New York Central company will let a contract for two package freight steamers of the largest type used in that trade, the vessels to be completed late next season. Orders from the Bessemer Steamship Co. for one or two more vessels, which have been expected for some time, are not forthcoming, and it would seem that the policy of the Rockefeller management is to await, when it is convenient to do so, conditions in the ship yards that will prompt low prices. All but three of the Bessemer company's vessels are now laid up. A few of the smaller barges of the fleet were tied up as early as Nov. 10. With the wind-up of the Lake Superior ore trade in which they had been engaged, they were ordered into winter quarters, having moved only a few cargoes of coal or grain throughout the season.

Newspaper dispatches sent out from Cleveland, several days ago, announcing that the Carnegie-Oliver ore interest had acquired a control of the Cleveland-Cliffs Iron Co., were not thought worthy of denial, but as the report has been extensively copied, it may be well to say that a denial has been obtained from Mr. W. G. Mather, president of the Cleveland-Cliffs Co. There is absolutely no truth in the report. Increased value of Cleveland-Cliffs stock, which declined some time ago on account of general depression in iron mining stocks, is due to the probability of a resumption of dividends, and to the fact that the few shares of the stock that are to be found on the market at any time were quoted at a price that was very low, based even on the quick assets of the company.

## New Lake Survey.

Every naval officer who has been detailed for light-house service on the lakes during the past four or five years has recommended a general survey of the lakes. When a resurvey was first recommended, and before the hydrographic office of the navy department began the establishment of branch offices in lake cities, it was thought that the naval officers connected with the light-house service were opposed, through a spirit of rivalry, to the survey made by the army engineers and opposed also to that branch of the government continuing the work of correcting lake charts. Vessel owners were therefore not much interested in the subject of a resurvey. They were of the opinion that the naval officers objected to the charts largely for the reason that they were made by the army engineer officers. But with deeper channels and vessels of deeper draft new shoals are being found in all parts of the lakes and the demand for a resurvey is more urgent.

Commander Folger of Detroit, in his latest report to Washington, recommends a new survey, and Commander E. H. C. Luetze of Chicago, who is in charge of the Lake Michigan district, writes Capt. Geo. P. McKay of Cleveland on the subject. Capt. McKay had informed Commander Luetze of an obstruction reported by Capt. Wm. Loud of the Milwaukee steamer Wolf, who says that on Nov. 6, while bound to Ashtabula from Escanaba with ore, and with his vessel drawing not more than 17 feet, he struck about midway between the gas buoys at Poverty passage, entrance to Green bay. The red or north gas buoy was about abeam. In answer to this report Commander Luetze says:

"I thank you very much for the information in regard to steamer Wolf striking an obstruction in Poverty island passage. I am, of course, glad to receive any reports of the kind, and only wish the masters of the lake vessels were more communicative with us. I should be very glad to hear their views on anything belonging in this district. I will examine the spot reported in the spring, but I am firmly convinced that a systematic survey of the lakes in general, and the northern part of Lake Michigan in particular, is urgently needed."

The "Notices to Mariners" that are sent out each month by the hydrographic office are also making up a volume of argument in favor of a general survey of the lakes. The November pamphlet, just issued, is especially valuable on account of several small charts which accompany it, and which represent the result of special surveys made by officers of the U. S. S. Michigan at different points on the lakes where obstructions were reported. These include Barbed point shoal and Pipe island shoal, Detour passage; Bear island shoal, Devil's island shoal and Sand island shoal in the Apostle group of islands, Lake Superior; Middle shoal in the vicinity of Waugoshance light-house, Lake Michigan, and Rush shoal (new name) near North Manitou island, also in Lake Michigan. No vessel master should be without this November "Notice to Mariners," as it contains important information regarding a large number of shallow spots, changes in lights, etc.

## Powerful Steamers are Needed for the Big Consorts.

The experience of the steamer Bulgaria with the big steel tow barge Amazon on Lake Superior is conclusive proof of the inability of the old type of wooden steamer to handle the modern 6,000-ton barge. In calm weather the Bulgaria has towed this barge from the Sault to Duluth in forty-eight to fifty hours, but on this fall trip, meeting with head winds, snow storms and bad weather generally, she was forced to seek shelter, and was full ten days in making the trip. When the Corrigans of Cleveland began to build steel tow barges to be placed behind their wooden steamers, it was thought that this would be the policy of other owners of good wooden ships who found themselves unable to compete with the steel carriers on account of the great difference in capacity. The loss in capacity of the steamer would be made up, it was claimed, by the advantage to be gained in towing a large barge. But the power of the wooden steamers has proven altogether inadequate. Further proof of this conclusion is found in the fact that the steamers now being built to tow these big consorts will have, with quadruple expansion engines and water tube boilers, a horse power in some cases of 2,300 to 2,700.

## American Society of Naval Engineers.

The annual meeting of this society will be held in Washington, Jan. 7 and 8. Friday, the first day, will be devoted to the reading and discussion of papers, the awarding of the medal for the prize paper, and such other business as may be brought before the meeting. The election of officers for the ensuing year will be held after this. The meeting will begin at 2 p. m. in the lecture room of the Columbian University, Fifteenth and H streets, N. W., courteously placed at the disposal of the society by that university. Papers to be read at this meeting should be sent to the secretary-treasurer before Jan. 1. Saturday forenoon will be devoted to a visit to the gun shops at the Washington navy yard, the congressional library, and other places of interest to visiting members. The first annual banquet of the society will be held at 7:30 p. m., Saturday, at Rauscher's, Connecticut avenue and L street, N. W.

Officials of the light-house service are considering plans for erecting cribs in the rivers and other enclosed places where gas buoys are now located, so that the lights may be shown from a stationary structure. In this way the lights may be placed in operation earlier in the spring and can also be kept up later in the fall. The work of the light-house vessels would also be lessened, and the cribs, unlike the buoys, would not be carried away by tows, as has been the case several times during the past season.

## Docks of Ohio Coal Co., Duluth.

Improvements in coal docks at upper-lake ports can hardly be said to have kept pace with the car dumping machines of shipping ports on Lake Erie, but a considerable amount of new construction work has been going on of late at the head of the lakes, and some of the docks of Duluth, Superior and Ashland are now capable of handling immense quantities of coal. Among the best of these docks is that of the Ohio Coal Co. at Duluth, opposite the entrance to the harbor and east of Garfield street. This dock is a sand-filled structure 1,560 feet in length by 300 feet in width, on which both hard and soft coal are handled. While the arrangement of most docks in the neighborhood permits of the mooring and unloading of coal-laden vessels on one side of the dock only, the Ohio Coal Co.'s dock has two water fronts available for this purpose. The dock is symmetrically arranged, with double railroad tracks running through its center. These tracks are straddled by a high trestle, on top of which rest two single-rail tracks, on which are run the large conveyor trusses. The water-front ends of the trusses rest on movable towers. Along one side of the trestle supporting the conveyor trusses is arranged a shed 950 by 150 feet covered by a water-tight roof for the storage of anthracite coal, all of which is kept under shelter.

Fig. 1 is an illustration representing the dock from the storage shed side, showing the conveyor trusses from which coal is dumped into the shed by temporarily removing a section of the roof underneath. When the dock was originally built in 1883 structures similar to those shown in the accompanying illustrations, constructed of timber throughout, were provided. These structures were designed for smaller buckets than those in use at present, which had to be loaded by hand. In 1895 the old wooden conveying trusses had become worn to such an extent that either extensive repairs or renewal became imperative. It was therefore decided to practically reconstruct the trusses, trestle and towers of steel adapted to heavy, self-filling, clam-shell buckets, and also to equip the towers with new hoisting machinery operated from a new stationary steam plant. Six new trusses with extension booms overhanging the vessels, and three 90-foot sections of trestle over the central tracks were erected; new machinery was provided for ten sets of conveyors and a steam plant for twelve sets, and the large covered shed for storing anthracite coal was built. The steel sections of the central trestle rest on pile and concrete foundations.

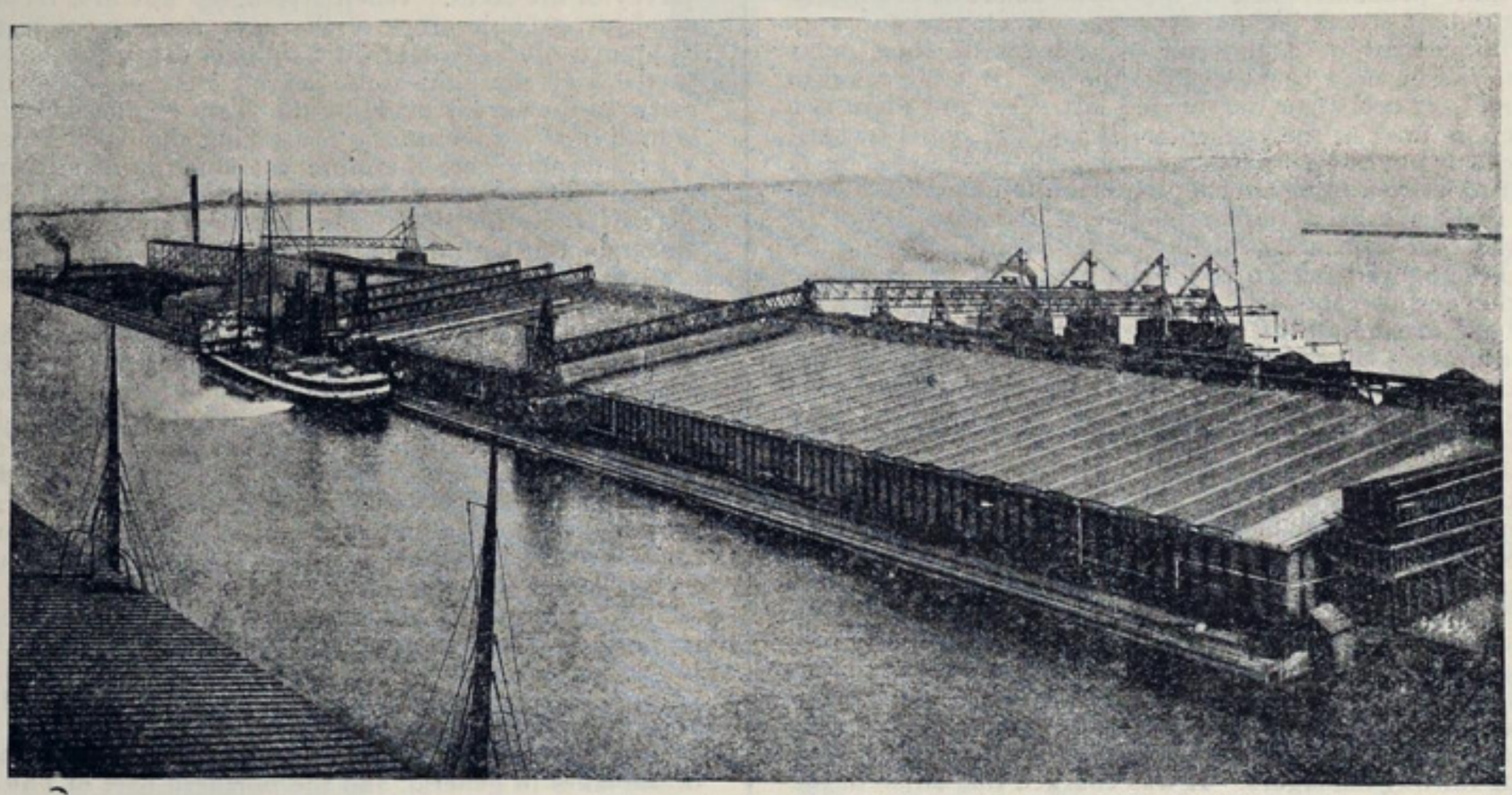
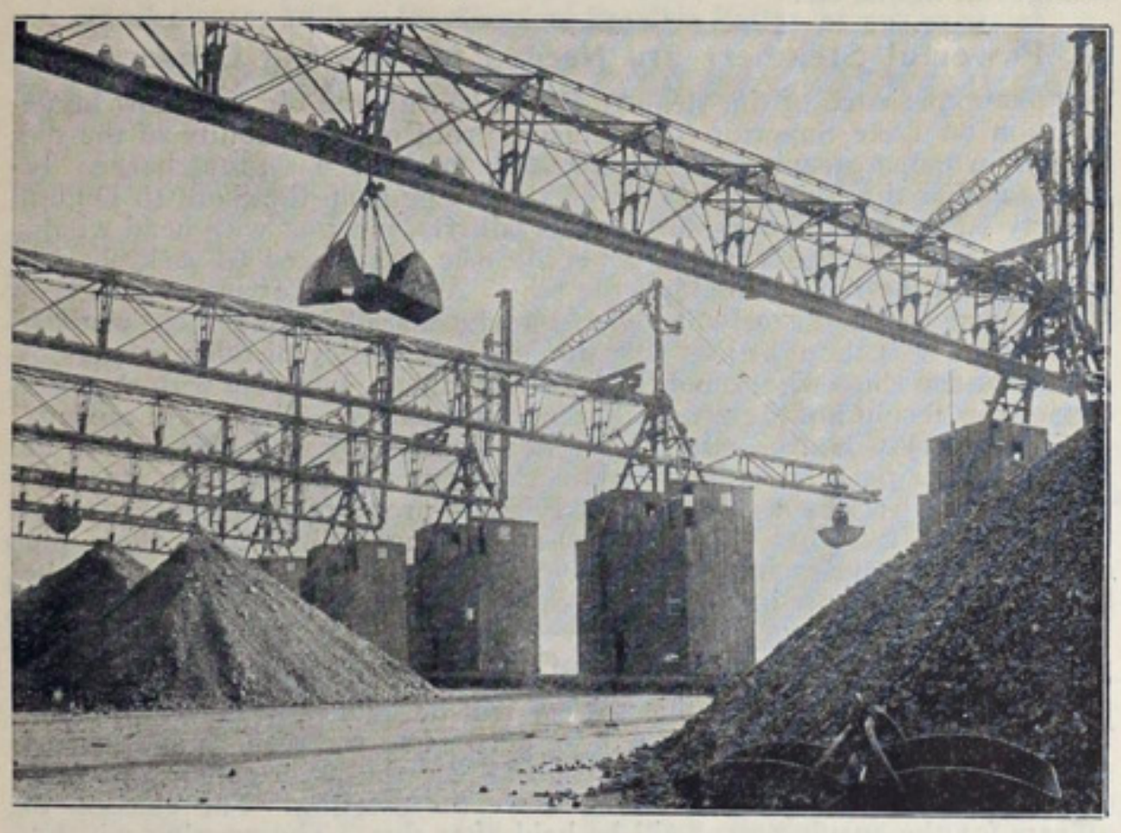


FIG. 1. OHIO COAL COMPANY'S DOCK AT DULUTH.

Fig. 2 shows these improved trusses and towers. The square movable towers under the water-front end of the trusses are so designed that they can be changed later on into a stationary trestle, requiring the placing of the moving and hoisting machinery to either side of the pyramidal portion of the towers; for this purpose it is intended to place a running track on the plate girders forming the tops of the square towers. This change is calculated to greatly increase the storage capacity of the dock, but it is not contemplated for the present. During this year four new steel conveying trusses with movable towers were erected, with enlarged extension booms somewhat different in design from those built in 1895, as will be seen in Figs. 3 and 4.

Power is supplied from a central steam plant of five 100 horse power boilers burning anthracite dust, the steam being conveyed on each side of the dock through 8-inch steam mains, protected by Harvey's patent wooden jackets, which reduce the condensation to a minimum. At intervals of about 200 feet along the pipe line it is provided with expansion joints and drip traps to carry off the condensation. The pipe has 125 openings, permitting the making of connection at almost any point where it is necessary to place the hoisting rig. The hoisting from vessels and stock piles is done by means of double-drum engines with steel Boge carriages and Newell & Ladd self-filling clam-shell buckets. The equipment of ten derricks gives an average daily capacity of 4,000 tons, in unloading vessels, and a like amount in loading cars. This latter work is done by means of pockets along the railroad track in the center of the dock, from which the coal goes over chute screens into the cars. The screenings are handled by the Jeffrey conveyor and revolving screen and are thus separated into the different sizes.



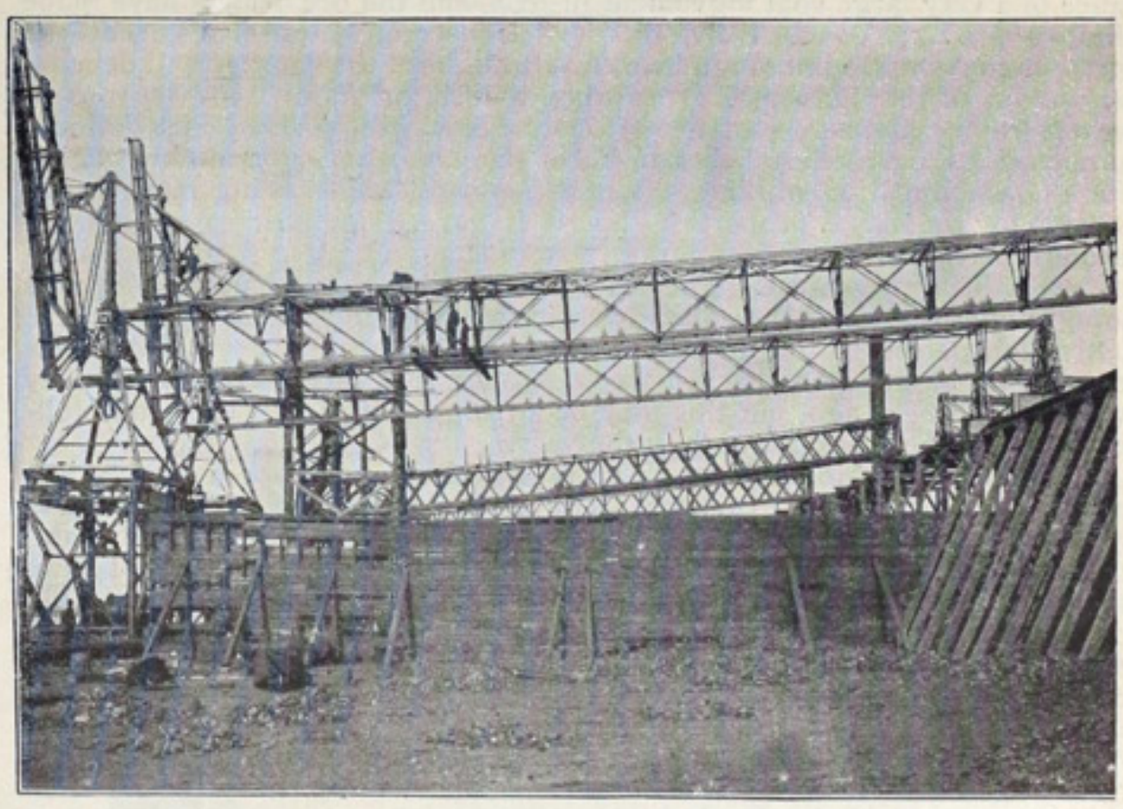


FIG. 2. 1895 CONSTRUCTION.--CONVEYOR TRUSSES. FIG. 3, 1897 CONSTRUCTION.

The structural work in 1895 was furnished by the Lassig Bridge & Iron Works of Chicago, and erected by Messrs. Kelly & Atkinson of the same city; that of the present year was furnished and erected by the J. G. Wagner Bridge Works of Milwaukee. The steam plant was furnished in 1895 by Messrs. Robinson & Cary, of St. Paul. The entire superstructure is of reamed soft steel, designed by K. E. Hilgard, consulting engineer of St. Paul, late engineer of bridges for the Northern Pacific Railway; he also had general supervision of its manufacture and erection. The main trusses, about 146 feet in length, weigh twenty tons each and the lower square movable towers ten tons each. A complete conveyor, including the 46-foot extension boom, upper pyramidal tower,

carriages and fixtures, weighs about forty-five tons. Each section of the stationary trestle weighs about forty-five tons. The total superstructure comprises about 600 tons of structural work, for which the contract prices for structure erected, complete, ranged from 3.15 cents per pound in 1895 to 2.75 cents per pound in 1897. We are indebted to the Railway Review for the illustrations and description of this plant.

## Details of the Tilden Lease.

With the formal transfer of the Tilden mine from John D. Rockefeller to the Oliver Mining Co., a few days ago, the office of the mine was removed to Ironwood, where Manager Cole will be located. Details of the purchase of a controlling interest in the Norrie group of mines by the Carnegie interest have been made public and now the particulars of the Tilden deal are also coming to light. The Tilden is leased for fifty years to the Oliver Mining Co., the underlying leases from the fee owners to the Tilden company being correspondingly extended; the minimum amount to be mined every year during the life of the lease is 400,000 tons. The owners of the fee have reduced their royalty from 30 cents, the former figure, to 25 cents per ton. The royalty to be paid the Tilden company by the Oliver Mining Co. is 50 cents per ton, of which amount the Tilden company retains one-half, the balance going to the fee owners. In addition to this, the Oliver company pays to the Tilden company $36,000 in advance royalty, buys all unused material on hand at cost and pays to the Tilden company outright a lump sum of $500,000 in consideration of the development of the property and the improvements thereupon, this payment of $500,000 being spread over a series of years with interest at the rate of 5 per cent., $80,000 of the principal to be paid each year. It will be seen that the terms of this lease are much the same as those of the Mountain Iron lease of last year, from the Rockefeller to the Carnegie interests, with the important exception that the Oliver company is not bound in the Tilden lease to ship its ore in Mr. Rockefeller's vessels and that a reduction in rail freights is not to be followed by a corresponding increase in royalty, as is the case in the Mesabi deal. The royalty of 50 cents per ton is decidedly a high one, in view of recent developments, and to that royalty must be added the interest upon the $500,000 bonus paid for the mine, which, on an average annual tonnage of 500,000 tons, would amount to 5 cents per ton. The Norrie royalty to the fee owners has for several years averaged about 6 per cent. on the selling price of the season's product delivered at lower lake ports. By the acquisition of the Gogebic and Mesabi range mines, secured within the past twelve months, in addition to the Pewabic mine of the Menominee range, controlled previously, the blast furnaces of the Carnegie Steel Co. are assured a steady supply of the principal grades ore required for many years to come. A few special grades might still be secured to advantage; for instance, a high silica ore, very low in phosphorus. Such ores can be bought in sufficient quantities in the open market, or mines producing such grades may be acquired in the future, but in the main the Carnegie interests are now independent of the ore market.

Changes will be made at both Norrie and Tilden in methods of work. At the Norrie the caving system will be used and the expense for timber greatly curtailed. It is stated that it is the expectation to make an output of 1,000,000 tons with a force of no more than 500 men. Coal will be used as fuel, thus doing away with a large number of wood cutters.

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Mr. C. B. Calder, superintendent of the Dry Dock Engine Works, was in Cleveland a few days ago and was elated over the success of the Detroit company in securing an immense amount of work for the winter in the line of alterations in ships, due to the application of the Howden hot draft. "We are in position," he said "to take an order for another ship or two, to come out next season, but if we get no more orders for new vessels I am satisfied that the heads of our company will feel that they have secured a fair share of general work. Latest advices from Mr. Howden of Glasgow are to the effect that the total of Howden draft installations throughout the world is 623 and the horse power aggregates 1,576,700. In addition to this there are eighteen or twenty large steamers on which the principals of the draft are now engaged and these will increase the horse power by about 120,000. Our concern keeps on announcing a new contract every week. The latest is for the passenger steamer City of Marquette, owned by J. M. Longyear of Marquette, Mich., on which general alterations will be made at our works during the winter."

## To Lengthen Big German Ships,

Few, if any, more noteworthy undertakings in the way of steamship lengthening and reconstruction have been carried out in this country than that which is contemplated in connection with the Spree and Havel of the North German Lloyd fleet, the execution of which has been entrusted to the original builders, the Vulcan Ship Building & Engineering Co. of Stettin, for whom, and for this undertaking specially, an immense floating dock is being constructed by Messrs. Swan & Hunter of Newcastle-on-Tyne. The Spree and Havel were completed in the early part of 1891 and 1892 respectively, the dimensions being 463 feet length, 51 feet 10 inches beam, 37 feet depth, moulded, the engines being of the five-cylinder three-crank triple-expansion type, developing 11,500 indicated horse power, and actuating a single propeller of 21½ feet diameter. The scheme of reconstruction of both vessels includes lengthening each of them 65 feet amidships, bringing up their length to 528 feet, augmenting the steam supply considerably, and substituting for the present single set of engines two new sets to drive twin screws. This latter feature will entail the reconstruction of the after end of vessel under water, as the shell is to be bossed out so as to envelop the shafts. The vessels have at present two boiler rooms, containing ten boilers, six of which are double-ended and four single-ended, all 15½ feet diameter, and working into two funnels. What is contemplated is to part the hull at a point between the after of the two boiler compartments and the engine room, and there fill in the 65 feet of new length. This will provide a new boiler compartment, making three in all, and in it there will be three additional double-ended boilers, making up the total number of furnaces to sixty-six. The new twin sets of engines will be of the four-cylinder four-crank type, with two low pressure cylinders, the power to be developed being about 18,000 horse indicated. When tried for speed originally the Spree attained a mean speed of 19.6 knots, the maximum having been 20.1 knots, with the engines developing 13,000 indicated horse power, and making 70 revolutions per minute. The change from single to twin screw, the extra length of hull, and the enhanced aggregate horse power, it is estimated, should yield an increased speed of at least 1½ knots. The new engines will be balanced on the Schlick-Tweedy-Yarrow system, of the success of which in minimizing vibration the latest example is the Kaiser Wilhelm der Grosse, about whose good qualities in this respect those who have traveled in her are agreed. The Stettin company has accomplished a great amount of docking and repair work on the floating dock which at present lies alongside its works. With the immense dock to lift 15,000 tons and carry a ship of 550 feet length, now being prepared by Messrs. Swan & Hunter, the firm will be well equipped for coping with the lengthening of the Spree and Havel, and for further work of this kind, which, apparently, both this and other large German firms regard as likely to increase and develop in the future. In the floating docks attached to the works of Messrs. Blohm & Voss, Hamburg, many cases of lengthening have been accomplished—notably the North German Lloyd steamers Preussen, Sachsen and Bayern—and it is well known that this firm have recently completed for their own use an additional floating dock of the enormous capacity of 17,500 tons, being the largest dock of its kind in the world. It is 560 feet long, 88 feet wide and 30 feet deep, thus exceeding in all its dimensions the dock recently despatched to Havana by Messrs. Swan & Hunter, which is 450 feet by 82 feet by 27½ feet.

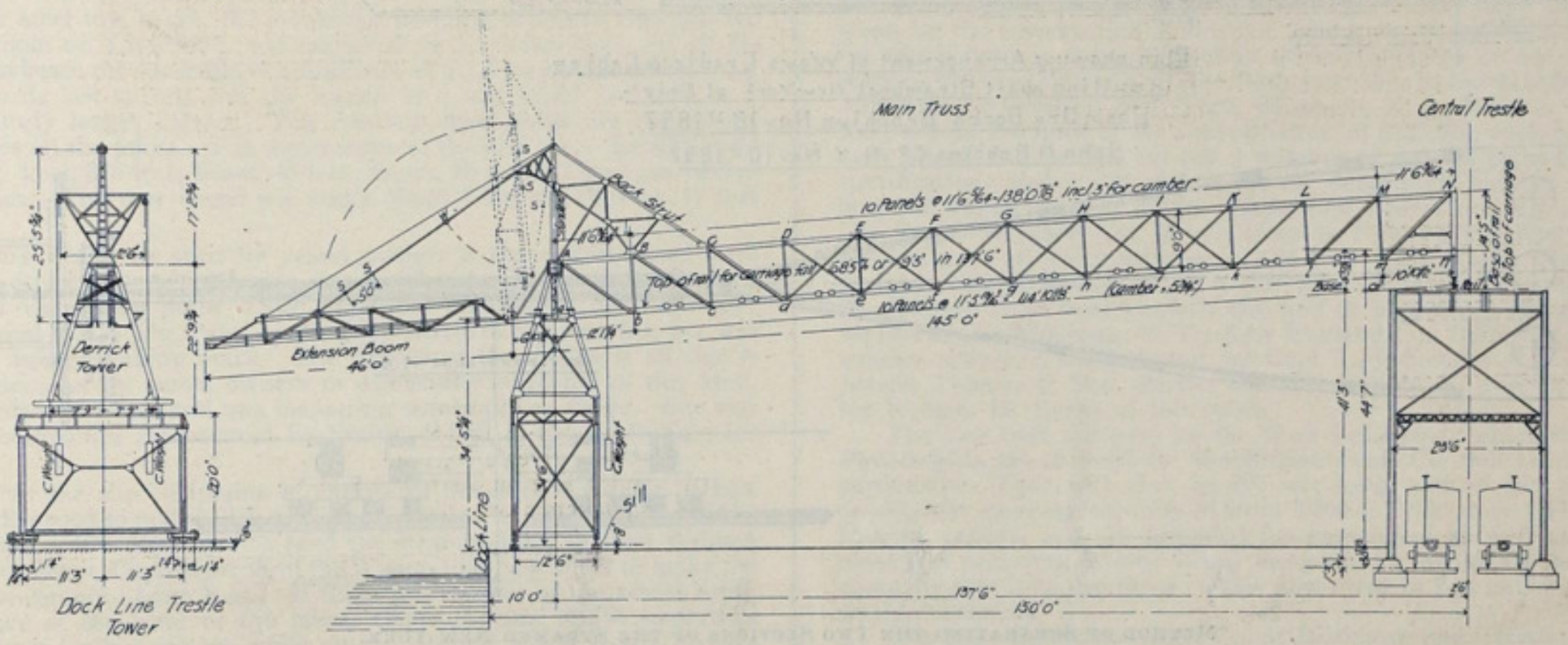


FIG. 4. SIDE AND END ELEVATION PLANS, OHIO COAL CO'S DOCK AT DULUTH.

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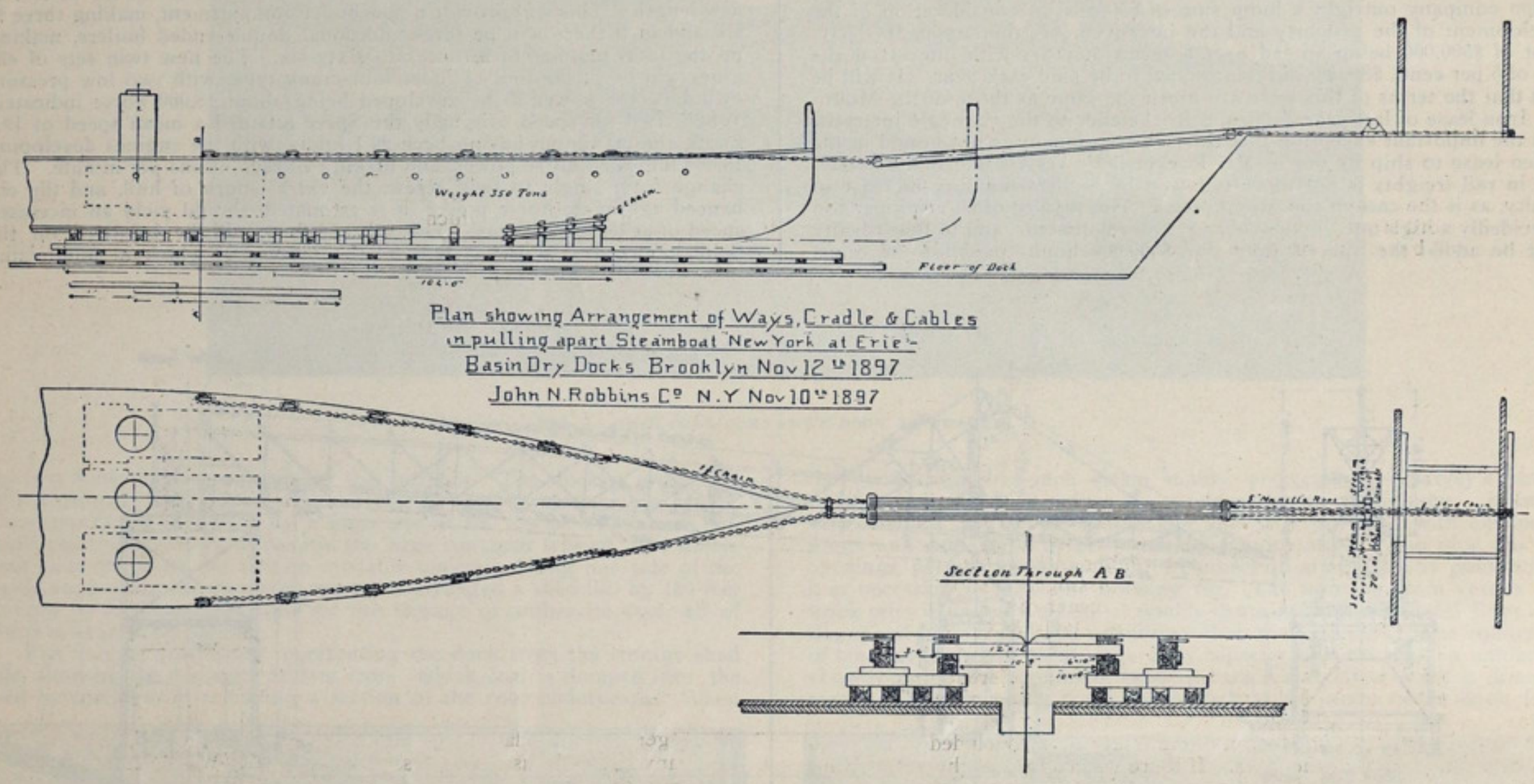
## Another Combination of Steel Interests.

If everything works smoothly the negotiations for a colossal wire consolidation may be closed in February. The undertaking is by far the greatest and most far reaching recorded in the history of the iron trade. Its ramifications extend far beyond the wire trade proper. In fact, we are advised that the tonnage of steel will be over 100,000 tons a month. It involves the incidental acquisition of some large steel plants. It is based, however, on the complete control of the live wire rod capacity in the country, and is to place the entire wire industry, in all its branches, under the complete domination of the consolidation. The smaller works and the subsidiary industries must depend for their raw material upon it. To what extent power would be tempered by wisdom time alone can teach. As a buyer of steel, such an enormous aggregation of mills and works would have an overshadowing influence. If the negotiations now in progress, with what is pronounced to be fair prospect of success, should end in a consolidation, then the whole iron trade of the country would have to face greatly changed conditions.—Iron Age.

## Lengthening a Hudson River Steamer.

In the last issue of the Review reference was made to methods adopted at the John N. Robins ship yard, Erie Basin, New York, in cutting the hull of the Hudson river steamer New York in two, hauling it apart and building a new section of 30 feet at the point of division. The accompanying diagram, which was prepared by the Scientific American from drawings furnished by the ship builders, gives a clearer explanation of operations on the vessel than could be obtained from the dispatches. It may be well to first give a description of the New York. She was built in 1887 at the works of the Harlan & Hollingsworth Co., Wilmington, Del., and is of the following dimensions: Length on water line, 301 feet; length over all, 311 feet; breadth of beam, moulded, 40 feet; breadth of beam, over guards, 74 feet; depth, moulded, 12 feet 3 inches; draught, 6 feet; tonnage (net 1091.81), 1,552. In the construction of the hull of this vessel, which is of iron, everything was done to cut down the weights and secure the light draught which is necessary for running at high speed over the shoals of the Hudson river. The frames, which are spaced 2 feet apart, are 4 inches by 3 inches by 7-16 inch; the reverse bars are 2½ inches by 2½ inches by 5-16 inch; the stringers are 4 inches by 3 inches by ⅜ inch, and the floors 16 inches by ⅜ inch. The shell plating is ⅜ inch throughout, except the sheer strake and garboards, which are ½ inch and 7-16 inch respectively. The hull is divided into four watertight compartments by bulkheads, which extend to the main deck and are free from doors or passageways, the compartments being entered by stairways from this deck. The boat is driven by a standard American beam engine of 3,850 horse power, with a cylinder 75 inches diameter by 12 feet stroke, provided with a Stevens cut-off. The 30-foot paddle wheels are of the feathering type. Steam is supplied by three return-flue boilers, 9¼ feet diameter and 33 feet long.


Weight 350 Tons
Floor of Dock
Plan showing Arrangement of Ways, Cradle & Cables
in pulling apart Steamboat New York at Erie-
Basin Dry Docks Brooklyn Nov 12th 1897
John N. Robbins Co. N.Y. Nov 10th 1897
Section Through A B

METHOD OF SEPARATING THE TWO SECTIONS OF THE STEAMER NEW YORK.

It was decided to cut the hull at a point between the engines and boilers, and the first step, after the vessel was floated into the dry dock and placed upon the keel blocks and bilge blocks in the usual manner, was to build launching ways beneath the forward part of the hull and transfer to them the load that was carried by the blocks.

The fixed ways, which were 10 inches deep by 14 inches wide, were laid upon blocking on the floor of the dock and well shored. Guide pieces were spiked to the outside of these ways to keep the sliding ways in place. The latter were built of 6 by 14-inch timbers and were tied together with 12 by 12 transverse timbers at regular intervals. The space between the transverse timbers and the floor of the hull was filled in with blocks and wedges, and at the forward end shoring pieces were substituted to accommodate the decreasing width and the taper of the bow. The length of these ways was 102 feet, and they were placed 10 feet 9 inches apart in the clear. At a distance of 3 feet 9 inches on the outside of the main ways, a pair of additional ways were built to take the weight of the boilers. The rubbing surfaces of the ways, which, of course, were planed and smoothed, were freely lubricated with a mixture of tallow and fish oil. When everything was completed, the wedges were gradually driven home until the weight had been lifted from the keel and bilge blocks and was carried entirely by the ways. The pulling apart of the hull was accomplished by means of four 1⅜-inch chains, a pair of 5-inch manila ropes working in fourfold blocks, and a couple of steam winches located at the head of the dock. A chain was led through the hawse hole on each side at the main deck and wound around four successive bitts, so as to secure a thorough distribution of the strain. Just in front of the stem they were lashed together, and made fast to a pair of fivefold blocks. The inshore blocks were connected to 1⅜-inch chains, which were led back through one of the dock buildings and secured to a 12 by 12 stick of timber placed on the outside of the building at the ground level. The falls of the tackles were led to a pair of steam winches. In cutting apart the iron hull, all that was necessary was to cut off the rivet heads and knock out the rivets. This was done in every case at the original butts. The three decks, partitions, guards and sponsons, were then sawn through and everything was now ready for the pull. At a given signal the forward half of the boat, weighing 350 tons, began to move slowly and steadily forward, and in exactly 5 minutes and 30 seconds it was stopped precisely at the measured mark, 30 feet ahead on the ways. When the two portions of the boat were lined up with fine pianoforte wire, it was found that one side of the bow had to be raised only 3-16 of an inch and the stem jacked over about an inch —a highly creditable result. During the building of the ways, the fifteen frames for the new section of the hull had been made in the shops to model. The work of carrying them into the dock and putting them in place was done by hand. It commenced on Saturday morning, and by noon of the same day the work was in frame. The framing and plating is similar to that of the rest of the hull, with the exception of two additional sister keelsons of ⅜-inch plate, which are spaced about 16 feet apart.

It is estimated that the additional buoyancy afforded by the new section of the hull will lighten the draft by 5½ inches. This, on a model of such great beam and fine lines as the New York, will give her an easier waterline and will, if anything, increase her speed. However, as the lengthening was undertaken with a view to increasing the passenger accommodation, which at present is 2,500, it is probable that with a larger load the speed will remain at 23 knots with forced draft or 20 knots under ordinary working conditions.

## Big Dredge for Buffalo Breakwater Construction.

The dredge Fin Mac Cool, now nearing completion at Buffalo, is one of the biggest machines of its kind ever built in this country. It was built under the direction of H. T. Dunbar, with a special view to economical work on the Buffalo breakwater contract held by Hughes Bros. & Bangs. The dredge is of the clam-shell type carrying a bucket of 10 cubic yards capacity, which is adapted to digging in 100 feet of water. The bucket weighs fifteen tons empty. The hull has a bow of the vessel kind and is 150 feet over all, 40 feet beam and 12½ feet depth. There are two condensing engines (Wheeler surface condenser) each 18½ by 24 inches, supplied with steam from two Roberts water tube boilers of 150 horse power each. Cable is used in the dredging machinery and also in the handling of scows, for which purpose there are three drums on each side on deck. Instead of the spud ordinarily used in dredges, kedge anchors of the Baldt type are used for mooring purposes. There are five of these kedges, and the cables attached to them are led down to the bottom of the dredge by posts forward and aft, so that tugs and scows can be moved around the sides of the craft without interference. This big machine is designed to hoist 200 tons 30 feet a minute. The main hoisting gears are 12 feet pitch and chain 12 inches fall. Drums are 5 feet diameter, compound geared, 3 to 1 and 6 to 1, equaling 18 to 1.

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Mr. E. S. Wheeler, who has for fifteen years had local charge of the important government works at Sault Ste. Marie, has been selected by the Nicaragua canal commission as an assistant engineer. He will join the commission in New York immediately and with other engineers selected for the work will sail for Nicaragua in a few days. The work will require six months to a year.

## Around the Lakes.

Roberts water tube boilers will be used in the steel tug to be built by the Union Dry Dock Co. of Buffalo for the Maytham Tug Line.

Invitations announcing the launch of the revenue cutter Algonquin at 2:30 p. m., Dec. 8, have been issued by the Globe Iron Works Co. of Cleveland.

A distance of 50,000 miles was traveled by the Detroit & Cleveland Steam Navigation Co.'s passenger steamer City of Alpena in fifty-eight round trips made during the past season between Toledo and St. Ignace.

Draft water at Ballard's reef, Detroit river, during the past week was 17 feet to 17 feet 6 inches, excepting on Monday, Nov. 29, when under a strong northwest wind the draft was at times as low as 16 feet 4 inches.

Elmer E. Ennes, who was employed as chief engineer of the steamer Louisiana and other vessels owned by Capt. John W. Moore, died in Cleveland on Friday last of consumption. He was thirty-five years of age.

Receipts of grain and flour (flour included as grain) at Buffalo to Dec. 1 aggregate 242,140,306 bushels, against 200,567,871 bushels on the same date in 1896 and 142,749,020 bushels in 1895. Hard coal shipments from the same port on the same date aggregated 2,097,929 tons, which is somewhat less than the shipments of 1896.

Ashtabula's ore receipts this season will aggregate full 3,000,000 gross tons. This is more iron ore than is received at any other port in the world. A like amount, approximately, has been received at Cleveland. This is the business that has built up several prosperous towns and cities in Ohio and Pennsylvania along the shore of Lake Erie.

Shipments from Bay City during the season now closed were: Lumber, 80,719,209 feet; lath, 2,670,000; shingles, 550,000; and salt, 49,960 barrels. The receipts of lumber were 23,668,150 feet. In 1896 shipments were: Lumber, 45,668,000 feet; lath, 150,000; and shingles, 275,000.

On Dec. 8 the thirty years of corporate life of the Detroit & Cleveland Steam Navigation Co. will have ended. A new company will on the same day be organized, to be named Detroit & Cleveland Navigation Co. (leaving off the word steam), which will assume all the liabilities of the old company and will buy all its property. There will be no change of policy.

Another steel tow barge, the Australia, building at South Chicago for James Corrigan of Cleveland, was launched on Saturday last. In all dimensions but beam the Australia is a duplicate of the Amazon, launched from the same yards last spring, but the former is 2 feet wider and will be a correspondingly larger carrier. The Amazon now holds the record for large cargoes on the lakes. The dimensions of the hull are: Length over all, 388 feet; keel, 376 feet; beam, 48 feet; depth, 26 feet. There are twelve cargo hatches. The new vessel will carry about 6,500 net tons on 17 feet draft.

Few tears would be shed by vessel owners if the underwriters were called upon to pay for a few more vessels like the Joseph Paige, which stranded on Vermillion point, Lake Superior, Wednesday, and was pronounced a total loss. The Paige was a good vessel in her time but she was beyond the money-making mark. The danger of loss of life is all that is taken into account by vessel owners in discussing accidents of this kind. John F. Wedow of Cleveland was managing owner of the Paige. She was insured in companies represented by Smith, Davis & Co. of Buffalo for $12,500.

Not all of the shore-captains in charge of the different fleets of lake vessels are disposed to make a trip to Lake Superior late in the fall. When it was decided, a few days ago, to send the steamer Rees to Fort William for a cargo of grain, Capt. Morton of the Wilson line concluded to make the trip with the captain of the Rees. If there was danger of the vessel being caught in ice at the head of the lakes, Capt. Morton might undertake some measures for her release while on the ground which would involve responsibility or a large expenditure of money that might cause the captain of the Rees to hesitate.

Capt. C. E. Benham of Cleveland, managing owner of the steamer Nahant, which was destroyed by fire at Escanaba Monday, had only $3,000 insurance on his five-eighths interest in the vessel. The insurance entire was only $6,000. The No. 4 ore dock at Escanaba, as well as the vessel, is almost a complete loss. The railroad loss on dock and cars is put at $150,000. The dock was 46 feet high and 1,500 feet long and had 250 pockets, with a capacity of 32,750 tons of ore. As there has been a larger dock capacity at Escanaba than the ore trade of the past two or three years has required, it is stated that the dock will not be rebuilt.

At Chicago and Sturgeon Bay, Wis., there are schools of navigation in which young men from lake vessels may receive instruction that will certainly prove valuable to them. The Chicago school is at No. 20 Michigan avenue and is under the direction of W. J. Wilson. The school at Sturgeon Bay is conducted by Clarence E. Long of the Sturgeon Bay Advocate. Circulars sent out by both schools indicate that they are attempting no great show of science, but are prepared to give to the young man, or even to the experienced vessel master, a great deal of sound information that may be profitably added to practical experience aboard ship. Both of these schools are worthy of encouragement and great advantage would be gained from the establishment of more of them around the lakes. Printed matter giving full particulars of these schools may be had upon application to the addresses noted above.

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The office of the Marine Review, Perry-Payne building, Cleveland, is the only place where a complete supply of lake charts of all kinds is constantly to be found. Every chart is corrected to date of issue, and the stock includes all publications of the hydrographic office, as well as the charts made by the army engineers corps. The vessel master who has charts made by the army engineers corps. The vessel master who has charts published two or three years ago will find new ones of far greater value in the list that has been increased almost every week of late. Prices are those fixed by the government, which do not represent even the cost of paper and printing. Sets of sectional charts of places like Green bay and Georgian bay, which in time past have sold as high as $15, may now be had on a single sheet at 30 cents to $1.

## Lifting Large Rocks.

Referring to the recent accident to the Buffalo steamer Lackawanna at Ballard's reef, due to striking rock thrown up in the work of channel excavation, a correspondent at Amhertsburg says that as tows were constantly carrying away the floats placed over such obstructions, the contractors have tried, as far as possible of late, to give notice to vessels approaching from both directions of the condition of the channel. "If deep-laden ships will be sure of keeping the upper range open a little to the west," he says, "they will clear the spot where the dredge has been working. Dredging operations that are being carried on by the Canadian government along the water-front at the town of Amherstburg will prove of great advantage. The stretch of channel that is being dredged extends out 300 feet from the dock. At several points well out in this channel boulders weighing full four tons have been raised, and they were so smooth from big vessels rubbing over them that you would have thought they were sand-papered. A few days ago the dredge raised an oak saw log about 16 feet long and 3 feet diameter, and in it was imbeded a large blade from a steamer's wheel. Vessel men of this place who talked with Capt. Thomas Jones of the steamer Iroquois are of the opinion that the obstruction which his vessel met with near Colchester several days ago was not the wreck of the steamer Grand Traverse. They are quite certain that this wreck has been cleared to a depth of more than 20 feet, and they say that from the bearings given by Capt. Jones it is more than probable that the Iroquois struck at Little's point. Capt. Jones, whose vessel was bound up with coal, says that as near as he can judge he was about two miles above Colchester reef light, the light bearing E. S. E. 2½ miles with Little's point just abaft the beam."

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## Notes of New Ships from the East.

New York, Dec. 2.—Plans of the composite steamer for which bids will be opened by the Coast and Geodetic Survey, Washington, Jan. 11, may be had by ship builders after Dec. 7. There is an appropriation of $125,000 for this vessel, which is intended for service in Alaska. She is to be delivered on or before Feb. 1, 1899, but speedy delivery is desired and will be taken into account in awarding the contract. In the competition for the construction of the new sailing vessel for the naval academy, for which there is an appropriation of only $125,000, or one-half the estimate of the navy department, the Bath Iron Works bid $112,600 and Lewis Nixon of the Crescent Ship Yard, Elizabeth, N. J., $121,950. While both were within the limit of the appropriation of $125,000, each bidder specifically stated that he had cut out a number of articles provided for in the specifications, and it will remain for the department experts to determine how the award shall be made. Other new orders recently reported are: Gas Engine & Power Co., Morris Heights, New York, a steel steam yacht, 103 feet over all, for a member of the New York Yacht Club; W. & A. Fletcher Co., Hoboken, N. J., a side-wheel passenger steamer to replace the Hudson river boat Catskill, the hull to be built at the yard of T. S. Marvel & Co., Newburg, N. Y.; New England Co., Bath, Me., four-masted wooden schooner, 182 feet long, for Capt. L. J. Stevens of Clinton, Conn.; Joseph Thomas & Son, Spring Gardens Baltimore, wooden steam yacht for William H. Evans of Baltimore.

The four fruit steamers for the West India trade which the Cramps of Philadelphia are to build for the Boston Fruit Co. will be modern in all particulars. They will each be 290 feet long, and 36 feet beam, with a deadweight carrying capacity of from 2,500 to 2,700 tons. They are to be 15-knot vessels, and are intended for passengers as well as freight, the passenger accommodations being designed for about 100 persons. The company that is to use these vessels now owns or has under charter some sixteen steamers.

The Lake Submarine Boat Co. of Baltimore now claims to have demonstrated in trials of the experimental boat recently built at that place the entire practicability of Lake's system of exploring the bottom of the seas, locating and recovering sunken vessels and their cargoes, as also its uses in the coral, pearl and sponge fisheries, etc. The company anticipates giving a series of trials exclusively for the press, to precede public trials, and newspaper representatives have been invited from different parts of the country.

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## Cargo Records—Lake Freight Ships.

The Rockefeller steamer George Stephenson has just moved 323,250 bushels of clipped oats, weighing 6,137 net tons, from South Chicago to Buffalo, the vessel drawing about 16½ feet. This is full 5,000 bushels more oats than had ever been moved in a single cargo on the lakes. Following is the corrected list of cargo records:

Iron Ore—Schooner Amazon, owned by James Corrigan of Cleveland, 5,631 tons gross, or 6,307 net, Duluth to South Chicago, draft of 17 feet 1 inch; steamer Empire City, A. B. Wolvin of Duluth, 5,622 tons gross, or 6,296 net, Two Harbors to Cleveland, draft of 17 feet 2 inches; schooner Polynesia, James Corrigan of Cleveland, 5,477 tons gross, 6,134 net, Duluth to Fairport, draft of 16 feet 8 inches.

Grain—Steamer Crescent City, A. B. Wolvin of Duluth, 225,000 bushels of corn, equal to 6,300 net tons, South Chicago to Buffalo, draft of 17 feet; schooner Amazon, James Corrigan of Cleveland, 205,572 bushels of wheat, equal to 6,167 net tons, Fort William to Buffalo, 16 feet 8 inches draft; steamer Empire City, A. B. Wolvin of Duluth, 205,445 bushels of wheat, equal to 6,163 net tons, Duluth to Buffalo; steamer Geo. Stephenson, Bessemer Steamship Co. of Cleveland, 323,250 bushels of clipped oats, equal to 6,137 net tons, South Chicago to Buffalo, draft of 16½ feet.

Coal—Schooner Polynesia, James Corrigan of Cleveland, 5,654 net tons of bituminous, Cleveland to Duluth, 16 feet draft; steamer Carnegie, Wilson Transit Co. of Cleveland, 5,369 net tons of bituminous, Cleveland to Duluth.

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A coal loading plant similar to that on the docks of M. A. Hanna & Co. at Ashtabula, is to be erected on the Baltimore & Ohio dock at Sandusky and will be finished in time for the opening of navigation next season.

MARINE REVIEW

DEVOTED TO LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 409 Perry-Payne building, Cleveland, Ohio, by John M. Mulrooney and F. M. Barton.

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The books of the United States treasury department on June 30, 1896, contained the names of 3,333 vessels, of 1,324,067.58 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1896, was 383 and their aggregate gross tonnage 711,034.28; the number of vessels of this class owned in all other parts of the country on the same date was 315 and their tonnage 685,204.55, so that more than half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1896, was as follows:

| | Number. | Gross Tonnage. |
|---|---|---|
| Steam vessels | 1,792 | 924,630.51 |
| Sailing vessels and barges | 1,125 | 354,327.60 |
| Canal boats | 416 | 45,109.47 |
| Total | 3,333 | 1,324,067.58 |

The gross registered tonnage of the vessels built on the lakes during the past six years, according to the reports of the United States commissioner of navigation, is as follows:

| | | | |
|---|---|---|---|
| Year ending June 30. 1891 | 204 | 111,856 45 |
| " " " 1892 | 169 | 45,968.98 |
| " " " 1893 | 175 | 99,271.24 |
| " " " 1894 | 106 | 41,984.61 |
| " " " 1895 | 93 | 36,352.70 |
| " " " 1896 | 117 | 108,782.38 |
| Total | 864 | 444,216.36 |

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC. (*From Official Reports of Canal Officers.*)

| | St. Mary's Falls Canals. | | | Suez Canal. | | |
|---|---|---|---|---|---|---|
| | 1896* | 1895* | 1894 | 1896 | 1895 | 1894 |
| Number of vessel passages | 18,615 | 17,956 | 14,491 | 3,409 | 3,434 | 3,352 |
| Tonnage, net registered | 17,249,418 | 16,806,781 | 13,110,366 | 8,560,284 | 8,448,383 | 8,039,175 |
| Days of navigation | 232 | 231 | 234 | 365 | 365 | 365 |

*1895 and 1896 figures include traffic of Canadian canal at Sault Ste. Marie.

Attention is again directed in a report from Major T. W. Symons, United States engineer at Buffalo, to the disputed question as to the right of the Delaware, Lackawanna & Western Railroad Co. to occupy the pier-property at the entrance to Buffalo harbor where that company has been loading vessels with coal for a great number of years past. This is an old question which in time past led to conflict of authority between the government and the railroad company, and which once threatened a disturbance in the Lake Carriers' Association. The right of the railroad company to occupy the pier has never been submitted to judicial decision. Its occupancy of the property and the valuable water-front facilities which it affords has been permitted, after the several conflicts of authority referred to, by agreements as to temporary use, between the officers of the railroad and the government authorities. In directing attention to the question at this time Major Symons does not enter specially into the right of the railroad company to occupy the property from the standpoint of ownership, but refers more particularly to the crowded condition of the harbor entrance, due to the mooring of vessels at the pier, and he recommends that this blockading of the channel be prohibited. Major Symons is one of the brightest and most energetic of army officers in the engineer corps, and if he has made up his mind to push recommendations in this regard, the railroad company may now meet with more determined opposition than in the past.

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Senator Cullom and all of the northern Illinois congressmen have promised to join the marine interests of Chicago in urging congress to order improvement of the Chicago river on the basis of a 21-foot channel, and to make available as soon as possible $400,000 of the $700,000 authorized for deepening and widening the river. In other words, the plan is to induce the general government to undertake the lowering of tunnels, widening of the river, etc., improvements which, at other places, are paid for by the municipalities. Chicago river is supposed to be under control of the war department and this is the argument offered in support of this special favor. Vessel owners of the lakes will probably not bother themselves as to where the money comes from for these improvements, but it would seem that the Chicago delegation in congress will find difficulty in convincing the river and harbor committee of the justice of their claim for appropriations to lower street railway tunnels.

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C. H. Bradley & Co. of Duluth have prepared figures regarding shipments of lumber from the head of the lakes. It has been found that, including a few cargoes yet to be forwarded, the shipments of 1897 from Duluth and surrounding districts will exceed those of 1896 by 38,000,000 feet. The increase of shipments eastward was about 13,000,000 feet. The rail shipments this year are about 25,000,000 feet, a liberal and gratifying increase in that direction as compared with last year. The greatest encouragement to be found perhaps is in the extensive preparations for a big cut in the woods the coming winter in anticipation of an even better year's business in 1898. The lumber cut by the Duluth-Superior mills for the season just ended, it is estimated, was 289,000,000 feet, or 106,000,000 feet in excess of the 1896 cut, but 4,000,000 feet short of the big cut of 1895.

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As had been expected, Secretary Long is very modest in his recommendations regarding new vessels, but he urges the construction of dry docks and improvement of navy yards. He recommends that the authorization of new ships by the coming congress be limited to one battleship for the Pacific coast, where, after the five now under construction are completed, there will be only two, while on the Atlantic there will be seven; and also to a few torpedo boats and torpedo boat destroyers, both of which are comparatively of little cost, and more of which are desirable in order to bring this swift, mobile and handily effective arm of the service up to its place in the general scheme for coast defense.

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George W. Aldridge, superintendent of public works in New York state, makes the following announcement regarding state canal improvements, for which $9,000,000 was appropriated some time ago: "There are now only two or three contracts of from $120,000 to $150,000 to be given out, when the amount raised by the sale of the state bonds will have been exhausted. It will take from $2,000,000 to $3,000,000 to complete the job as originally contemplated. The work now is more than two-thirds completed, but, to make the improvement lasting and beneficial, the depth of water in the Erie canal should be 9 feet, and in the Oswego and Champlain canals 7 feet."

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W. G. Wilmot, who died aboard the tug R. W. Wilmot near Norfolk, Va., a few days ago, while the vessel was bound to New Orleans from the ship yard of F. W. Wheeler & Co. of West Bay City, Mich., was among the best known and most successful business men of New Orleans. The new tug was the second one built by Wheeler & Co. for the firm of W. G. Wilmot & Co., which was composed of W. G. Wilmot and his son, R. W. Wilmot, and which controls a large business in coal at New Orleans and among sugar plantations along the Mississippi.

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Acting on the suggestion of Assistant Secretary of the Navy Roosevelt, that the old Michigan should be replaced on the lakes by a modern gunboat, the Illinois Naval Militia Association has petitioned congress to provide an appropriation for this purpose. As the reserves of Ohio and Michigan are now provided with practice vessels, it is probably the hope of the Illinois organization that they would have no difficulty in securing the Michigan if a modern vessel should be built to represent Uncle Sam on the lakes.

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Railway passenger agents have made wonderful progress in advertising methods of late years and the passenger department of the Nickel Plate road seems to be keeping pace with the best of them. The idea of issuing a map of Alaska, in view of the gold discoveries in that region, has undoubtedly proved advantageous in directing attention to the Nickel Plate line. The map is lithographed in six colors and its particular value at this time will cause it to be retained for reference wherever it is received.

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Labor Commissioner Cox of Michigan has just issued a report in which the number of vessels built by the different ship building concerns in the state is given as follows: F. W. Wheeler & Co., West Bay City, 128; Detroit Dry Dock Co., Detroit, 125; James Davidson, West Bay City, ninety; Abram Smith & Sons, Algonac, fifty; Langell & Sons, St. Clair, twenty-nine; Alex Anderson, Marine City, twelve; Marine Transit Co., Marine City, three.

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The total value of all manufactures of iron and steel, including machinery, exported from the United States during nine months ending Sept. 30, was $45,693,384, as compared with $34,549,290 in the same period in 1896, a gain of $11,000,000 or 33 1-3 per cent. The imports of iron and steel in the nine-months period this year were $10,831,992, as compared with $16,361,429 for the corresponding nine months of 1896—a falling off of 33 1-3 per cent.

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Another record was broken by the new German steamer Kaiser Wilhelm der Grosse on her last eastward voyage. She made the run from New York to Southampton in 5 days 18 hours. On the day before arrival in New York on the previous westward voyage the Kaiser Wilhelm der Grosse made 567 knots, beating her own record for a single day's run.

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Among papers to be read at the meeting of the American Society of Mechanical Engineers, now being held in New York, is one by Geo. W. Dickie of the Union Iron Works on "Auxiliary Engines and Transmission of Power on Naval Vessels," and another on the "Stevens' Valve Gear for Marine Engines," by Andrew Fletcher, Hoboken, N. J.

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A Duluth dispatch regarding ore shipments from the head of the lakes presents a forcible indication of the effect of big ships and deep water on the lake trade. At one of the ore docks the number of vessels loaded last season was 903, and they carried away 1,998,935 gross tons; from the same dock this season 617 vessels took 2,376,063 gross tons.

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There are now building for the United States navy five first-class battleships, one gunboat, sixteen torpedo boats and one submarine torpedo boat. These vessels should be completed during the coming year, except the five battleships, which will probably not be ready for service before the latter part of 1899.

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If Assistant Secretary Spaulding of the treasury department keeps on announcing in the newspapers the remission of fines assessed against vessels which he says himself were guilty of violation of the law, it will not be long until there will be little regard for navigation rules on the lakes.

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It is announced that the two big battleships, Kentucky and Kearsarge, now building at the Newport News ship yard, will be launched at the same time on the same day about the middle of January.

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"The Marine Review is the best American marine newspaper we get," says Mr. M. P. McElhinney, nautical adviser to the department of marine and fisheries, Dominion of Canada.

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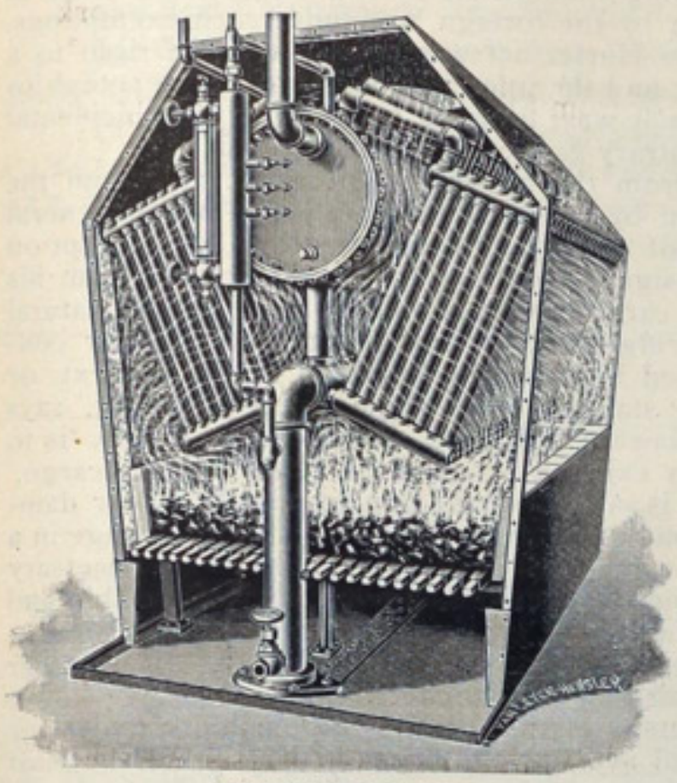
One of the latest of the British torpedo boat destroyers, the Crane, attained an average speed of 32.49 knots on trial.

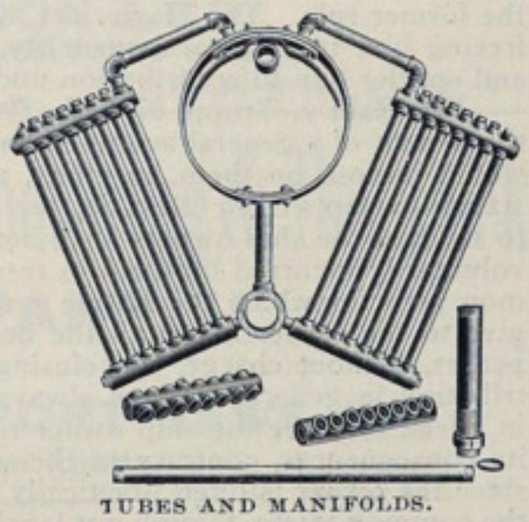
## The Detroit Boiler.

A new water tube boiler, to be known as the Detroit boiler, has just been brought out by the Detroit Screw Works, Detroit, Mich., and is illustrated herewith. In studying out this boiler, the inventor, Mr. H. H. Taylor, sought to improve upon the boilers heretofore in use in the following particulars: To make a boiler of the most simple design; one which can easily be cleaned internally with the ordinary flue scraper or other tools now in common use; one which can be more readily repaired than any other water tube boiler yet made; one in which separation of steam from the water is accomplished while rising to the drum, thereby dispensing with the superheating coils; a boiler which shall be all heating surface; to do away with the large, cumbersome pipes and fittings usually employed for the downflow and distribution of water; one having the most direct and positive circulation, constantly supplying all of the tubes with water, thereby preventing unequal expansion; one which will not prime during the hardest firing nor when starting the engine.



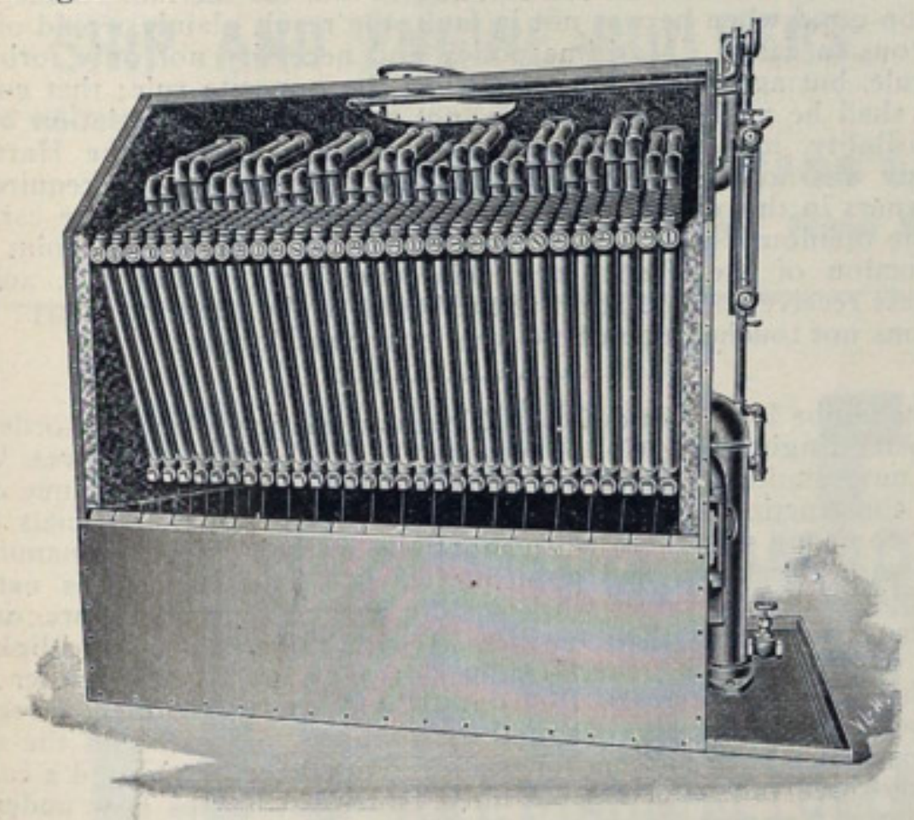
FRONT ELEVATION.

Referring to the illustrations, it will be seen that the Detroit boiler consists of one large upper drum, connected for its entire length to the water distributing pipe, below and parallel with it, by means of one row of vertical pipes for down-flow of water. To either side of the water distributer the lower tube manifolds are screwed in, and from these the tubes proper continue to the upper manifolds, which are connected to the top part of the drum with right-and-left nipples, for convenience of detaching in case of repairs. The tubes are inserted through the upper manifolds and screwed into both manifolds with right-hand threads, the top end of tubes being so enlarged that both ends engage at the same time. The holes in the top of the upper manifolds are closed with brass plugs, they not being exposed to the fire. Both manifolds are also plugged at both ends for convenience in cleaning out. To each end of the water-distributer is attached a sediment-pocket, extending to the floor. To this is attached a foot or flange for supporting and fastening the boiler, which is also supported at the sides by the casing, the latter being fastened to the plugs in the upper manifolds.



TUBES AND MANIFOLDS.

From the side elevation it will be seen that the manifolds are placed so close together that the flame has to pass first to the outside, then toward



SIDE ELEVATION.

the center, thus causing an upward circulation in the outer row of tubes, these being exposed to the hottest fire, and a downward circulation in those nearest the drum; hence the steam is partially separated from the water in the upper manifolds, before it enters the drum. When the steam enters the drum it strikes a baffle on either side, the water being cast down and the steam rising to the upper space where a perforated dry-pipe is located, extending from end to end of the drum.

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The Crosby Transportation Co. has chartered the steamer Mary H. Boyce for the winter route between Milwaukee and Grand Haven, service to begin about Dec. 20.

## In the Grasp of Jack Frost.

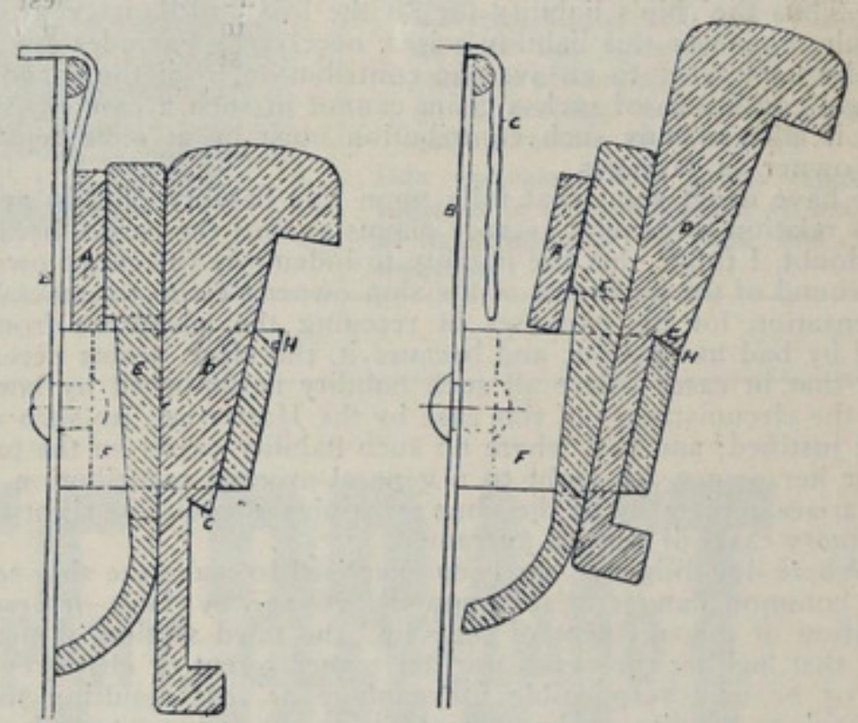
The novel illustration printed herewith is from the head of a card sent out by W. F. Herman, general passenger and freight agent of the Cleveland & Buffalo Transit Co., announcing the close of navigation. It has been thought worthy of reproduction. The original contains an attractive border and is neatly printed on a card somewhat larger than the ordinary postal card. It has attracted a great deal of attention among railway freight agents and shippers who have dealings with the C. & B. Co.

## The Queen's Yacht.

Machinery for Queen Victoria's new yacht, building at Pembroke dock yard, will be constructed by Messrs. Humphreys, Tennant & Co. of London. The yacht is to be of steel, sheathed with wood, and copper covered. She will displace about 4,600 tons on 18 feet draft, the length and beam being 380 feet and 50 feet respectively. She will have three funnels and two masts, and will be a yacht pure and simple, with no pretensions whatever to the cruiser element. There will be two sets of triple expansion four-cylinder four-crank engines, driving twin screws, and indicating, collectively, 11,000 horse power at 140 revolutions, equal to a piston speed of 910 feet per minute. With this power the yacht is expected to move at 20 knots an hour. Each engine will have one high pressure cylinder, 26½ inches; one intermediate, 44½ inches; and two low pressure, each 53 inches diameter; with a stroke of 39 inches. Steam will be supplied by eighteen Belleville boilers, working at a pressure of 300 pounds, reduced at the engines to 250 pounds. These boilers will have 4-inch tubes in the boilers, and 2¾-inch tubes in the economizers placed in the uptakes. With a total grate area of 840 square feet, and a heating surface of some 26,000 square feet, it is expected that these boilers will steam easily at 11,000 indicated horse power.

## New Hatch Cleat.

The Waters hatch cleat is an ingenious little time and labor-saving device recently patented by Joseph Waters of South Shields. The whole arrangement is so simple, and withal certain in its action, as to need no




description at our hands. A wedge-shaped socket F receives, previous to being fixed to the hatch coaming, the jambing piece E and the wedge D. These serve to firmly wedge the binding bar A against the coaming B, the tarpaulin cover C being between them. Neither the jambing piece or wedge can come out of the socket, as they are retained by the lips and shoulders shown, while similarly when disengaged the wedge is prevented from falling into the locking position by the bevelled edge G resting upon a corresponding edge H on the socket.—Shipping World, London.

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Referring to a notice in the last issue of the Review from the American Ship Windlass Co. about wire rope used on their towing machines, a Philadelphia correspondent says: "Somebody is evidently badly mixed up in this statement about the strength of hawsers. From the table of equipment in the rules of Lloyd's Register, it appears that the breaking strain of a 22-inch hemp hawser is 104 tons, and that of a 5½-inch (1¾ inch diameter) steel hawser is 71 tons, and not 7,000 tons, as stated in the article referred to."

## Negligence, the Harter Act and General Average.

AN OPINION TOUCHING A MOST IMPORTANT POINT IN THE CONSTRUCTION OF THE HARTER ACT IS ATTRACTING ATTENTION IN SHIPPING CIRCLES.

The steamship Irrawaddy (British), Trinidad to New York, was negligently stranded on the New Jersey coast. Up to the time of stranding she was properly manned, equipped, seaworthy and properly navigated. In endeavoring to release her, certain damage was done her machinery, and the aid of salvors was necessary. A quantity of cargo was jettisoned, the balance delivered to consignees, and average bond taken. On adjustment, two items were objected to by the cargo owners; one, gross freight on cargo jettisoned, and the other, damages to the machinery by sanding and by the flow of water into the engine room. The cargo owners based their objection "on the ground that as the stranding was caused by negligence in navigation, the ship owners were debarred from any recovery of general average from the cargo." A question was also made on the allowance of freight.

The libelants contended that the Harter act while it excused the vessel owner from liability to cargo owners for negligent navigation, permitted general average contribution. The case was tried to District Judge Brown of the southern district of New York, and decided Sept. 9, in favor of the claim for general average. The court fully recognizes the general rule of maritime law that in the absence of contract or statute modifying it, a ship owner, where the peril has been brought about by the faulty navigation of the ship, "cannot recover from the cargo reimbursement by means of a general average for his expenses in rescuing the ship or cargo." Judge Brown said:

"Considering that the claim to contribution in general average rests only upon equitable principles, it is hardly conceivable that this rule of exclusion could be otherwise. For if one's own fault, or the fault of those for whom one is legally responsible, had made necessary the expenses he incurs to retrieve it, there is no principle of equity that can sustain his claim that other persons, not in privity with him, should help him bear the loss. It is the responsibility for the fault and for the consequent damage that makes the crucial distinction in these cases. All the maritime codes that exclude the ship owner from reimbursement in general average for the ship's fault, make him liable to cargo owners for the master's bad navigation. This exclusion is based on his liability to the cargo owner, which logically and necessarily excludes the ship owner's claim to contribution in two ways: First, because the obligation to indemnify would require the ship owner at once to restore to the cargo owner as damages whatever he might collect from him as general average; second, because this same obligation makes the ship owner's claim to contribution incompatible in its exception with the fundamental conditions of a general average claim, viz.: that there must be (1) a sacrifice, (2) a sacrifice voluntarily incurred, (3) a sacrifice incurred for the common benefit. But when the ship, through the master's fault, is legally responsible for all loss and damage, her expenses in rescuing the cargo from the peril which that fault has brought about cannot possibly be treated as a sacrifice, since such expenses are nothing more than the performance of a legal obligation; for the same reason they are not voluntarily incurred, in the legal sense, since the ship is legally bound to make the rescue and bear all the expense of it, or else pay the increased damages from omitting to do so; and so the expenses of rescuing the cargo are not ultimately for the cargo's benefit, but for the pecuniary benefit of the ship, in diminishing as much as possible the cargo damages for which the ship's liability is already fixed by reason of her fault. Thus the ship's liability for all the loss and damage arising from her fault, whenever this liability arises, necessarily excludes any equitable claim by her owner to an average contribution from the cargo, because the legal conditions of such a claim cannot in such a case exist; and because, if allowed, any such contribution must be at once repaid to the cargo owner as damages.

"I have dwelt somewhat fully upon this liability of ship and owner, and its relation to general average claims against the cargo, because there is no doubt, I think, that the liability to indemnify the cargo owner is the sole ground of the exclusion of the ship owner's claim to general average compensation for his expenses in rescuing the adventure from a peril caused by bad navigation; and because it, therefore, seems necessarily to follow that in cases where all such liability is abolished by law, as it is under the circumstances of this case by the Harter act, no such exclusion can be justified; and that where no such liability exists on the part of the ship or her owner, his right to a general average contribution from the cargo arises necessarily by the same principles of equitable right that apply in ordinary cases of general average.

"Where due diligence has been exercised to make the ship seaworthy, and a common danger arises upon the voyage by 'fault or error in the navigation or management of the ship,' the third section of that act declares, that 'neither the vessel nor her owner, agent or charterer shall become or be held responsible for damage or loss resulting therefrom.' The previous liability of the ship owner to the cargo owner for faults of navigation is thus abolished in all cases coming within the act. In such cases, faults in the navigation or management of the ship are no longer, by construction of law, faults of the owner, as heretofore; and the ship and her owner are now no more liable to the cargo owner for his damages therefrom than the latter is liable to the ship owner for the resulting damages to the ship. Both are alike strangers to the fault, and equally free from all responsibility for it; and hence all expenditures or losses voluntarily incurred for the common rescue are no longer made in the discharge of an individual legal obligation, or in diminution of a fixed liability resting upon one of the parties only, but are truly a sacrifice, voluntarily incurred, and for the common benefit, as much and as truly when made by the ship owner as when made by the cargo owner alone. On principle, therefore, in such cases, the one is as much entitled to general average contribution for his sacrifices as the other."

The court then considers the policy of the law in permitting recovery in general average of cargo owner against ship and other cargo owners, where the peril arose from bad navigation, notwithstanding the vessel's liability in damages by reason of the negligent navigation, and continues: "It is urged that the Harter act makes no allusion to general average, and was not designed to disturb the law on that subject. This might have been urged more plausibly as to the effect and intent of the negligence provisions in bills of lading. Several of the above adjudications as to the effect on general average of such clauses in bills of lading, were made long before the passage of the Harter act; and the history of that act shows that it was a part of its general intent to secure to ship owners under our law, and within the limits prescribed by our act, the benefits enjoyed by ship owners under such bill-of-lading exemptions by the foreign law. One of the benefits to the ship owner by the foreign law under such exemptions, as already adjudged when the Harter act was passed, was the right to a general average contribution; and the inference, if any as to the actual intent of our act would be that it was designed to embrace that incidental consequence; at least, the contrary cannot be affirmed.

"Quite aside, however, from the above adjudications, and from the question of any definite intent by congress to modify the law of general average, the ordinary rules of construction require that the exemption which the act is evidently designed to afford to the ship owner from his previous responsibility to the cargo owner, should be given its full natural scope and effect, without abridgement by any arbitrary or narrow construction that is not warranted by anything apparent in the context, or from the evident object of the statute. 'The whole object of the act,' says Mr. Justice Brown in the Delaware, 161 U. S., 459, 16 Sup. Ct., 516, 'is to modify the relation previously existing between the vessel and her cargo,' and to fix that relation, that is, a relation of non-responsibility for damages or losses arising out of bad navigation. Such a statutory change in a broad principle of law must carry with it other changes as its necessary accompaniment. In abolishing the previous responsibility of the ship and owner, the intent of the statute must be presumed to be to abolish also whatever is immediately dependent upon that responsibility. In no other way can the statute have its fair and natural effect.

"The application of this new relation of non-responsibility under the Harter act to cases of general average, does not, in fact, make the least change in the principles of general average contribution. The rule remains as before, that he by whose fault, actual or constructive, the ship and cargo have been brought into danger, cannot recover an average contribution for his expenses in extricating them. And so the counter rule remains as before, that the interest which, being without fault makes sacrifices for the common rescue, is entitled to an average contribution from what is thereby saved. Prior to the Harter act, the ship owner, under our law, was constructively in fault for bad navigation, and hence fell within the former rule. The Harter act, by abolishing his constructive fault and freeing him from all responsibility, withdraws him from the former rule and entitles him to contribution under the latter.

"In Ralli v. Troop, 37 Fed., 890, it was said that 'to deny the owners the benefit of a general average contribution on the ground of negligence, would impose on them, in effect, a liability, for the fire from which the statute exempts them (Rev. St., section 4282).' And so in the present case, to say that the ship owners shall bear at their own charge all the expenses voluntarily incurred by them in rescuing this ship and cargo from a common peril for which the statute says they shall not be responsible, and to give to the cargo owner all the benefits resulting to him from these expenses, without charge, by refusing to impose on him the ordinary contribution in general average always hitherto made to one not in fault, is, in effect, to make the ship owner responsible, pro tanto, for the peril and its consequences, contrary to the very letter and purpose of the statute; since the owner is often practically compelled to make these advances for the common safety, though not legally responsible for the fate of the cargo.

"It is, indeed, the owner's duty to relieve ship and cargo in every peril so far as in his power; but not to do this at his own charge, unless the peril arose through his actual or constructive fault. The Portmouth, 9 Wall., 682, 687. If the law denied contribution to him for sacrifices made for the common good when he was not in fault, the result plainly would often be disastrous to cargo. Maritime policy and necessity not only forbid any such rule, but ages ago they established the opposite rule; that compensation shall be made to those who, not standing in any relation of legal responsibility, make sacrifices for the common safety. The Harter act certainly was not designed to disturb that principle; and it requires that the owners in this case shall receive due contribution from the cargo."

The opinion is well considered and touches a most vital point in the construction of the Harter act. The question is important, and will doubtless receive consideration at the hands of the supreme court. Other questions not touched upon here were also considered.

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The Globe Iron Works Co. of Cleveland has just placed an order with the Foster Engineering Co. of Newark, N. J., for thirteen valves, United States navy standard, which are to be applied to the lake revenue cutters under construction at the Globe ship yard. One of the officials of the Foster company says there is great activity in their line—the manufacture of pressure regulators and reducing valves. The business is naturally amphibious, as their valves work equally well on ship and shore, on land and sea, but large as their business is with railroads, electric light and power plants, and the general industries, they are in even closer touch with ship building interests. Substantially all the government vessels are equipped with their valve, as well as hundreds of vessels in the ocean, coastwise, lake, river and harbor traffic. They have just closed a contract for sixty-three valves for three United States battleships now under construction at Newport News, and the Japanese and Brazilian cruisers Kasagi and Nichtheroy are being equipped with the Foster regulator. A list of vessels thus furnished has just been sent us, containing the names of vessels, owners and builders, and this list will be cheerfully sent, on application, to all interested.

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Subscribers to the Review who have been receiving the paper through the marine postoffice, Detroit, will please notify us of home addresses at once, in order that changes may be made for the winter.

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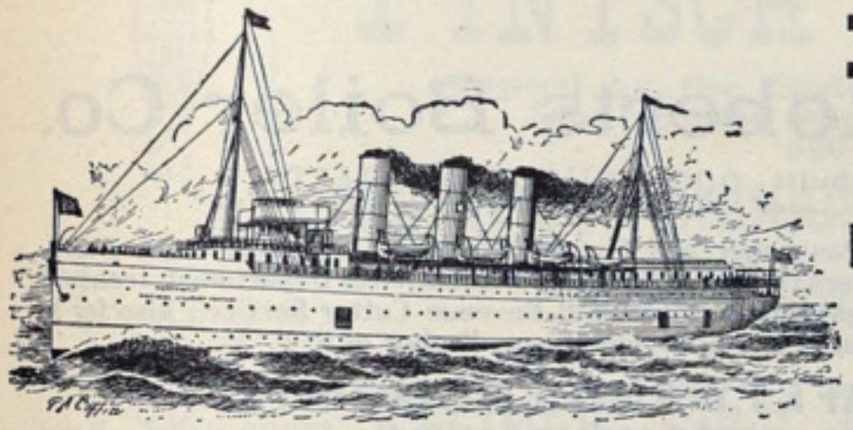

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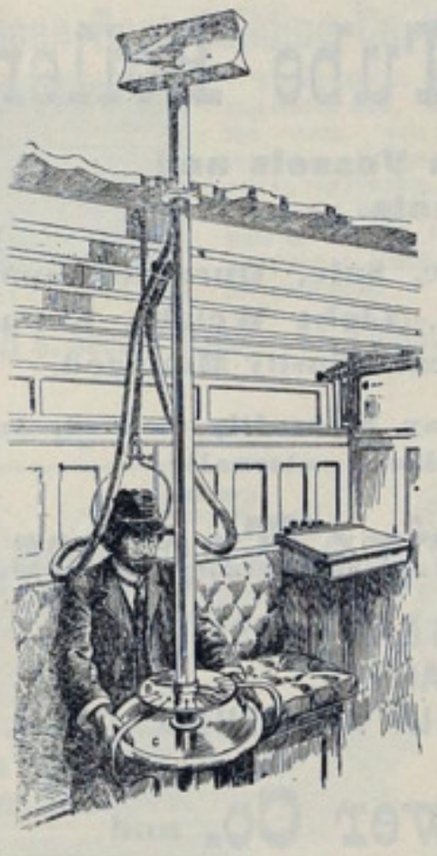

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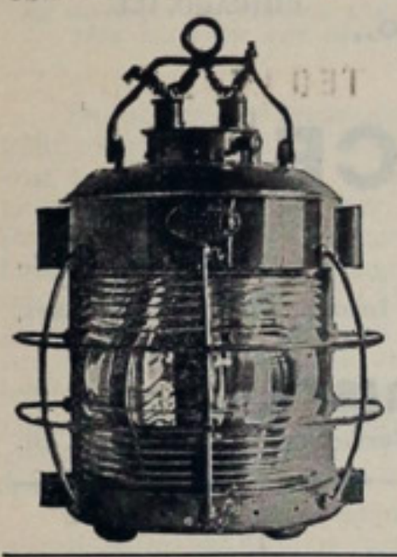

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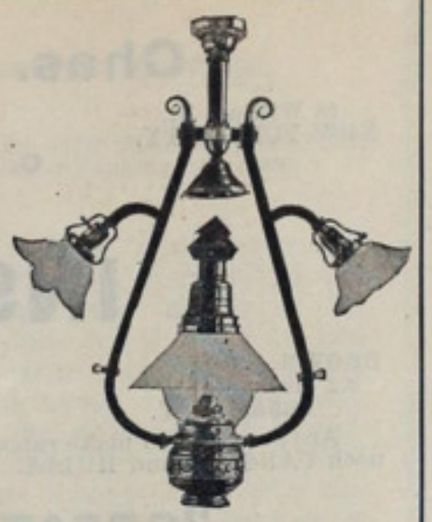

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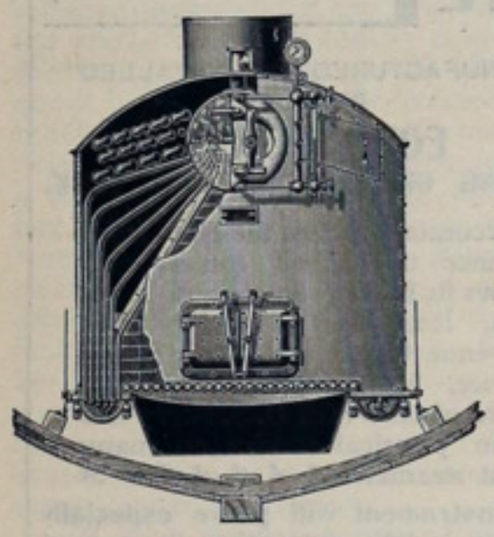

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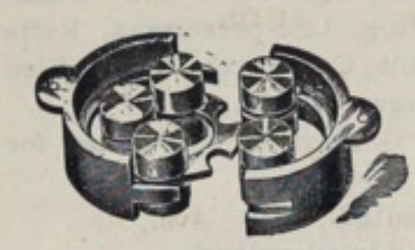

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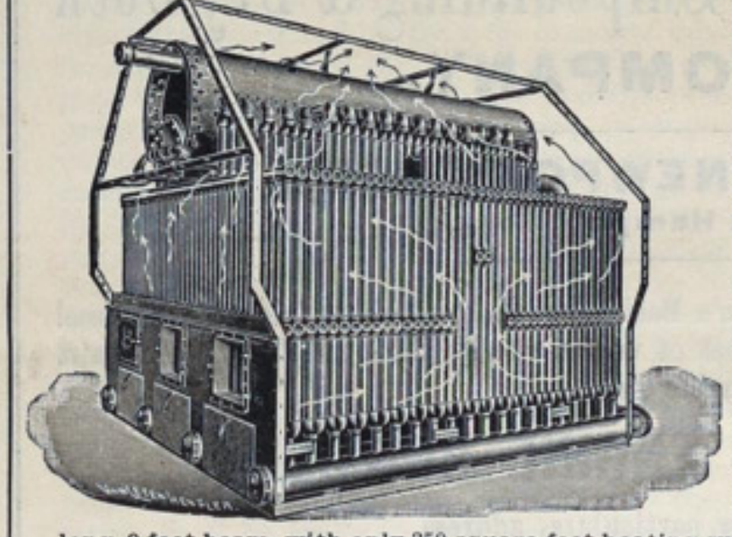

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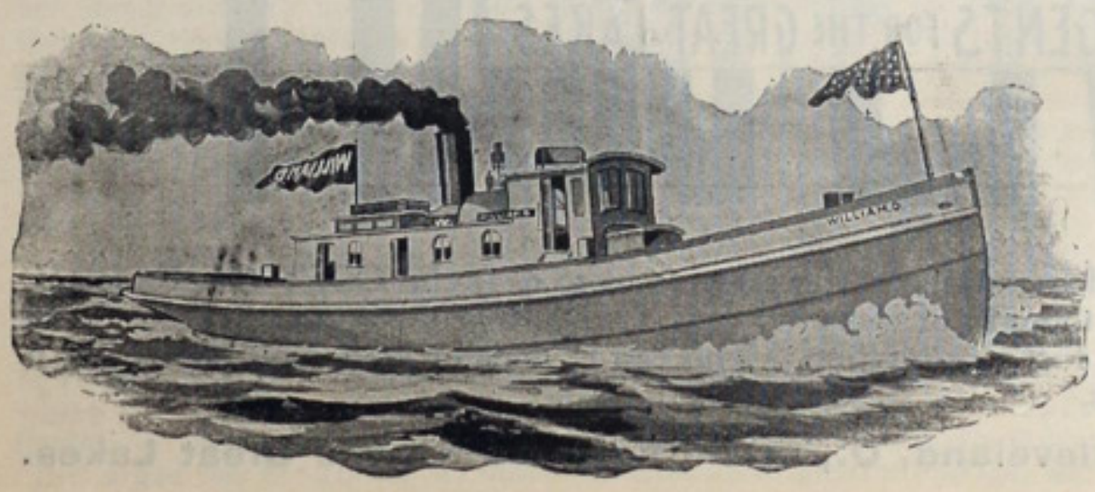

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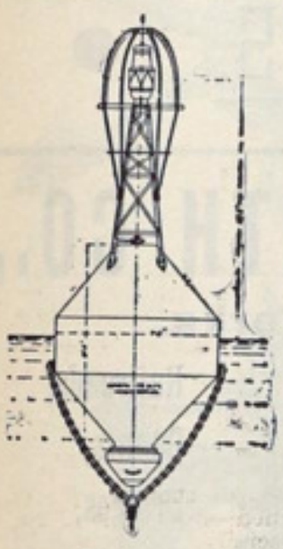

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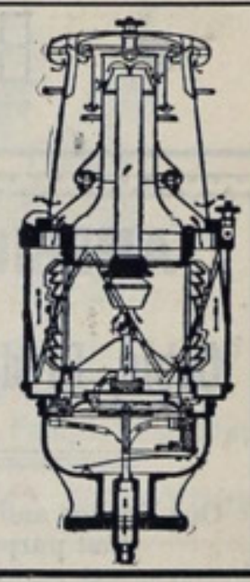

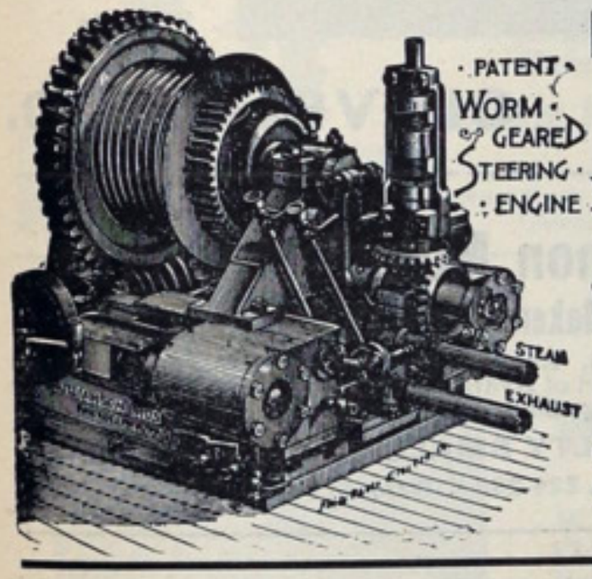


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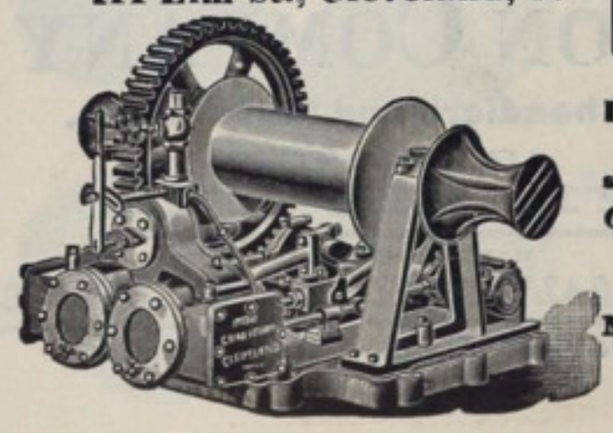

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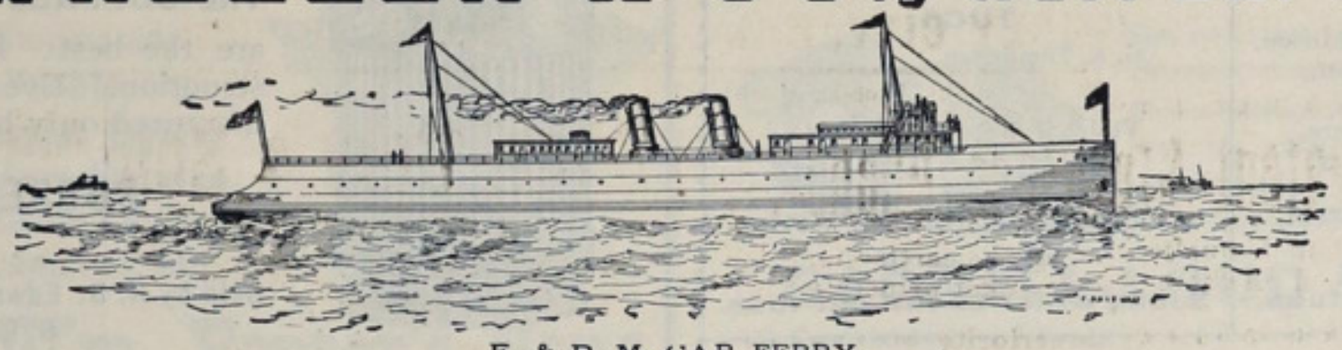

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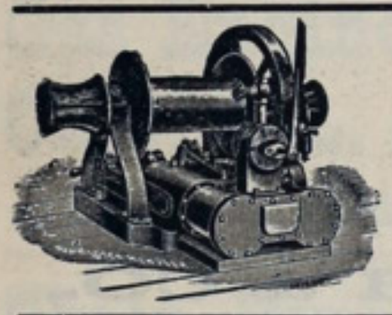

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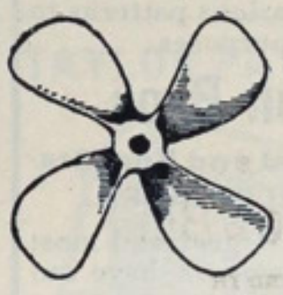

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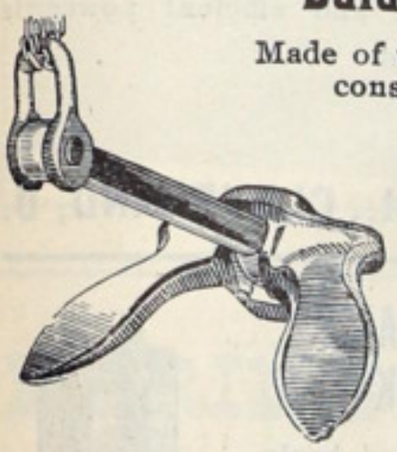

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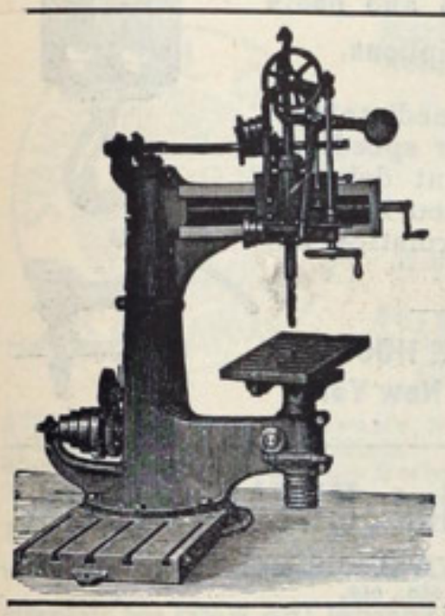

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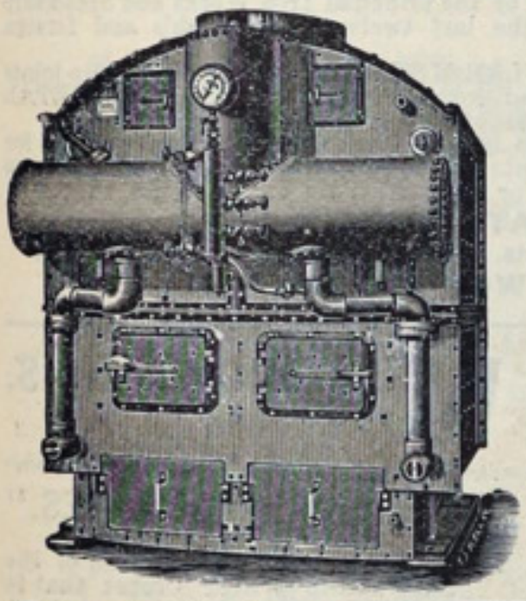

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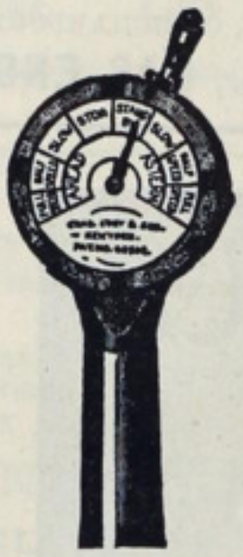

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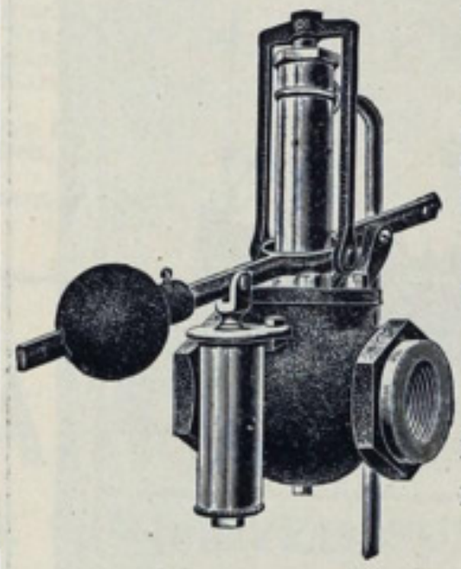

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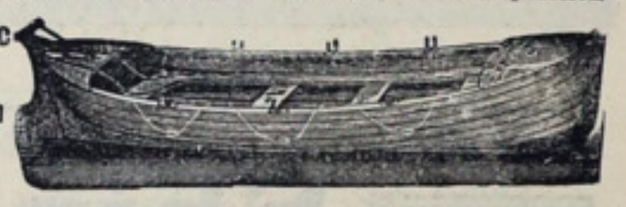

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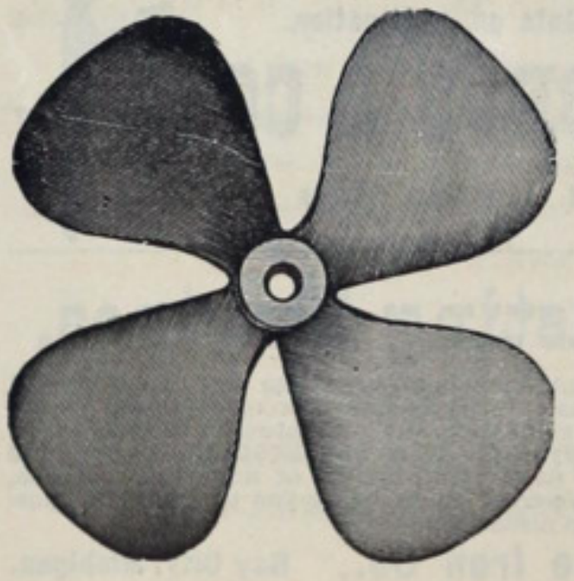

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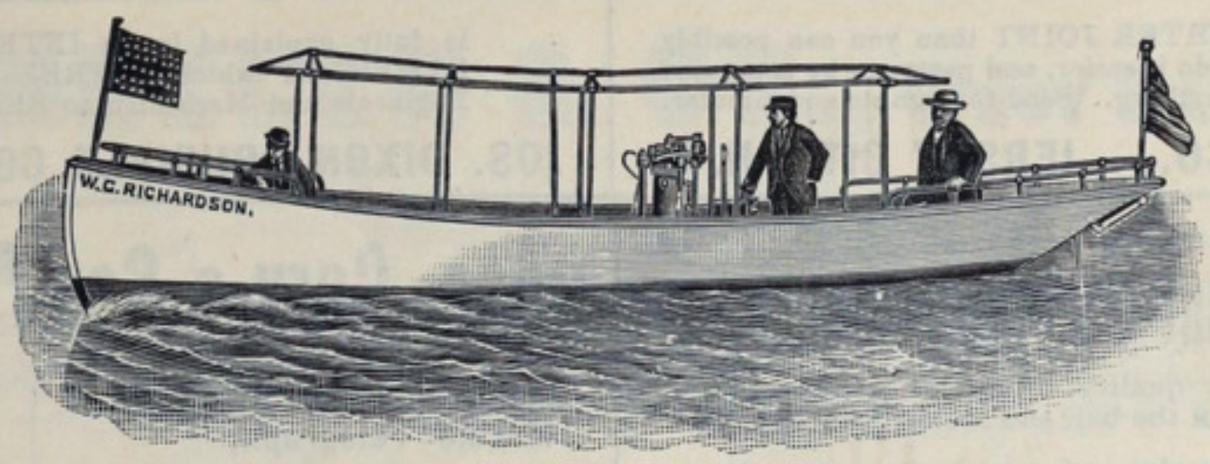


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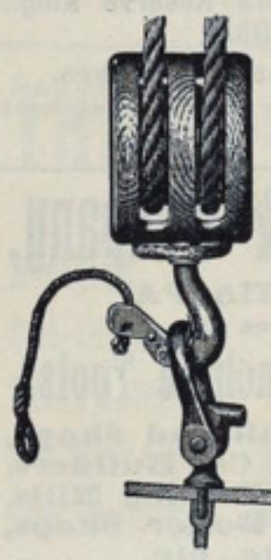

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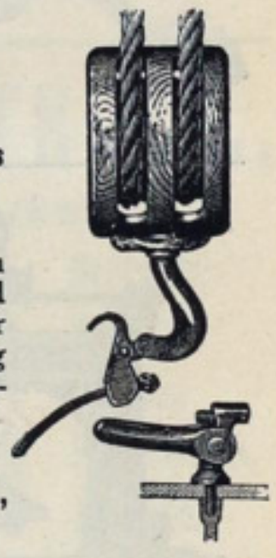

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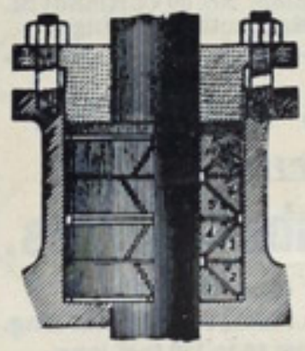

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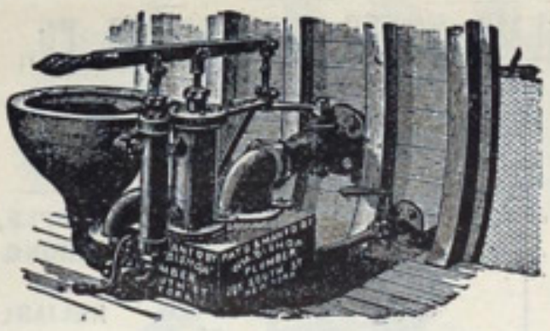

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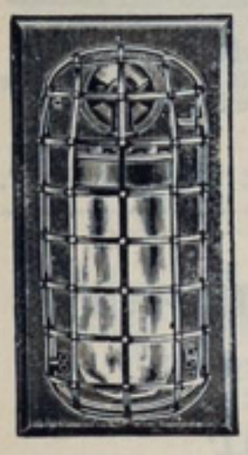

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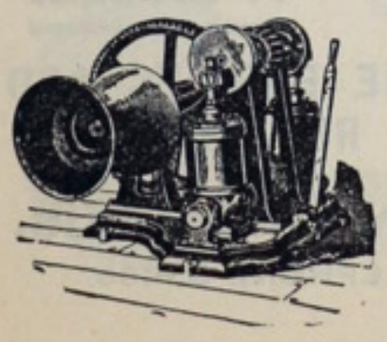

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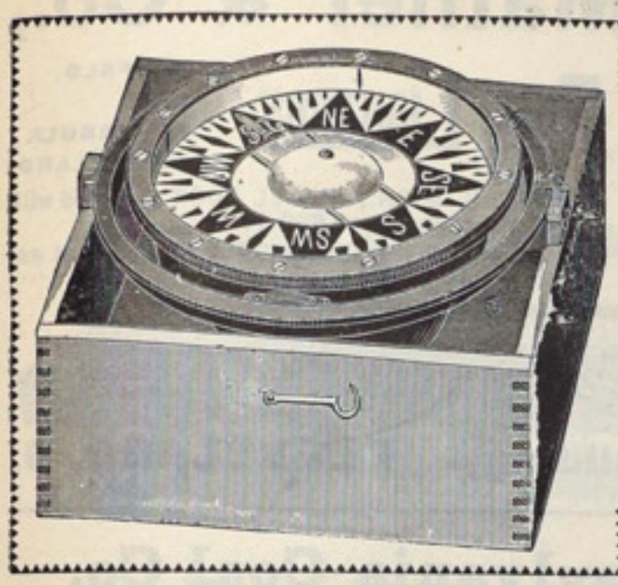

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Gentlemen:-

Yours of July 21st, with the 1897 Blue Book of American Shipping sent on approval, arrived here during my absence. Our Auditor will to-day remit you the $5. due for the book, which is certainly a very creditable and interesting publication.

Yours truly,

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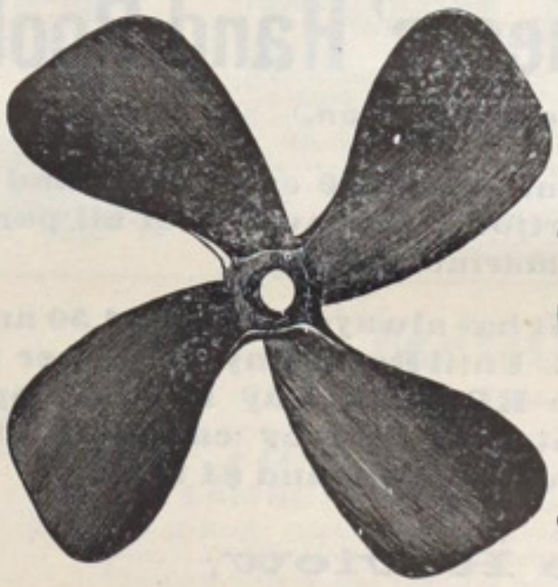

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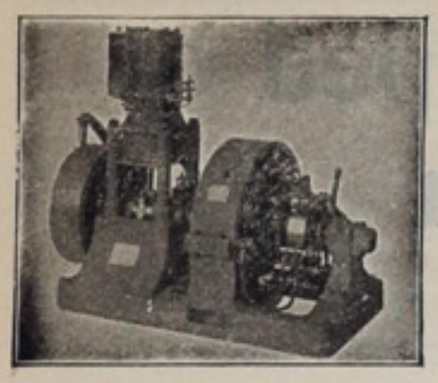

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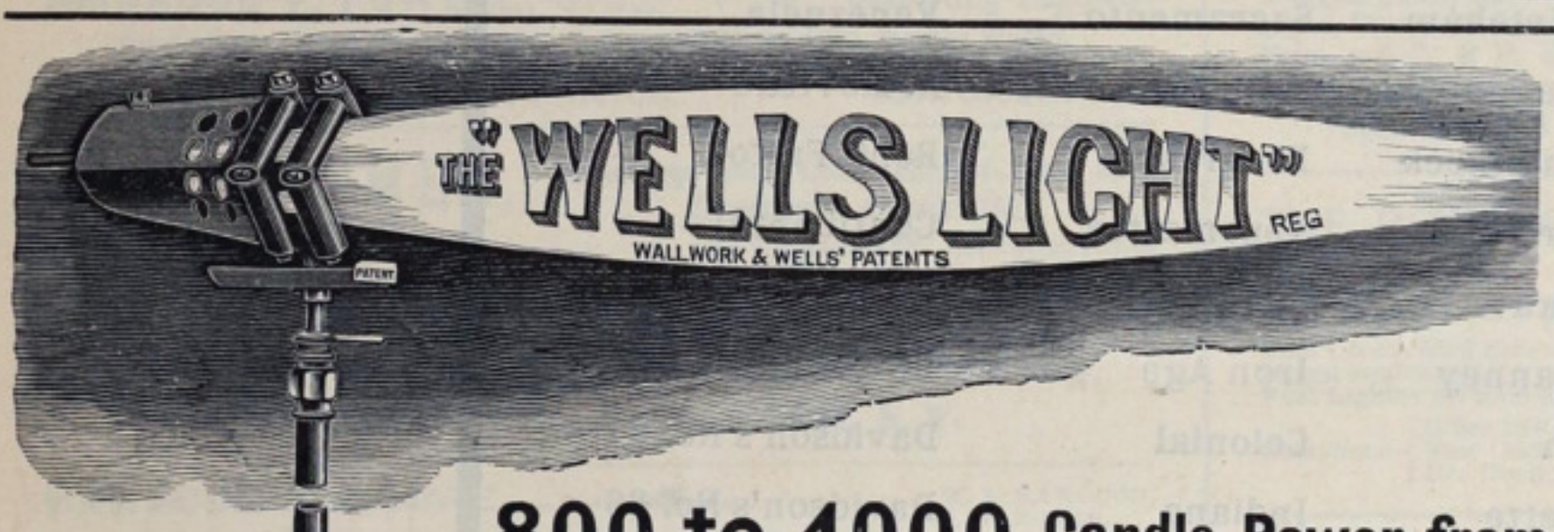


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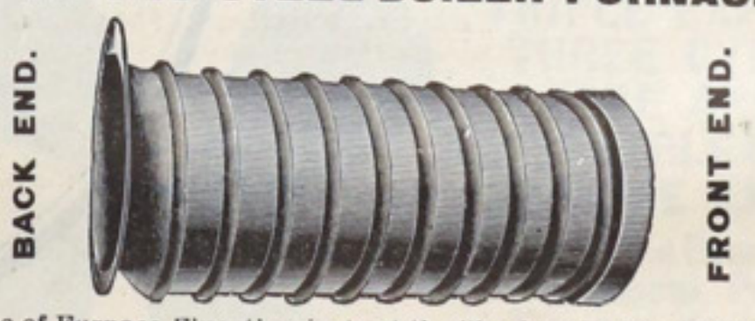


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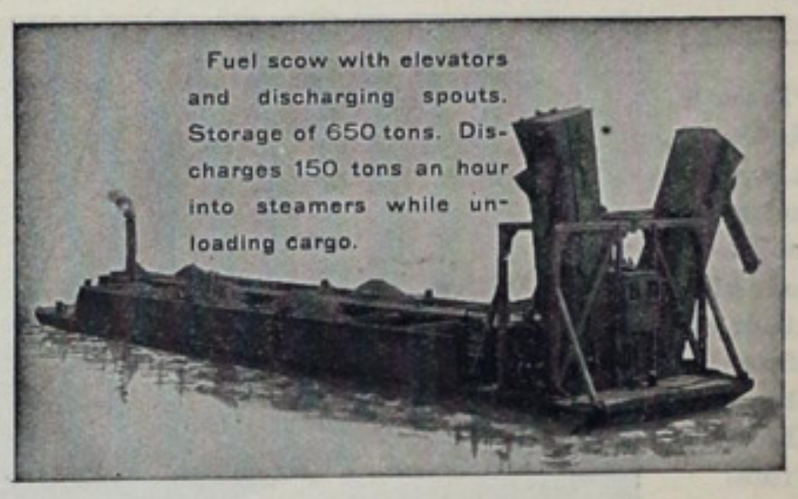

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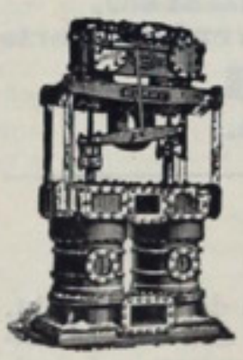

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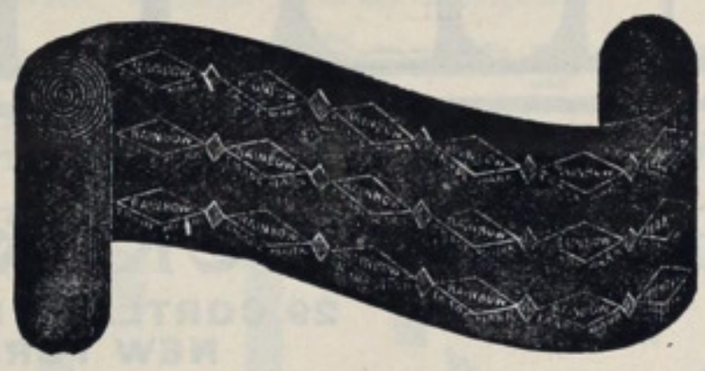

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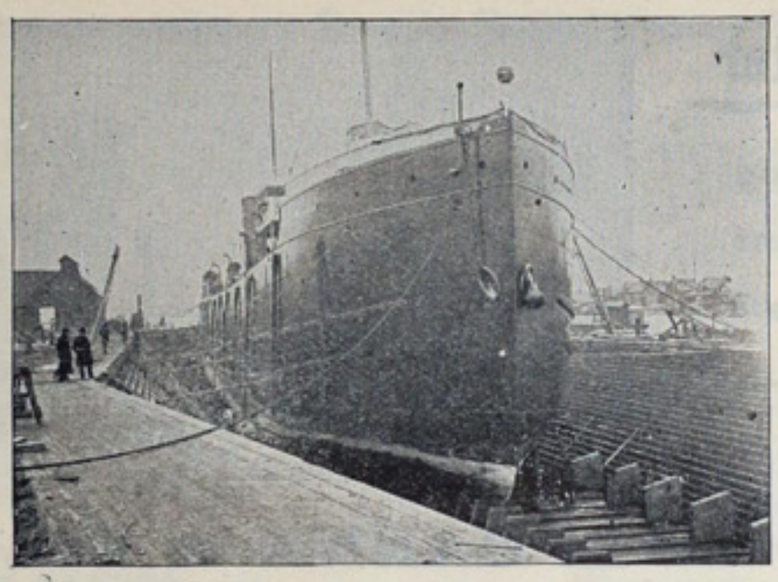

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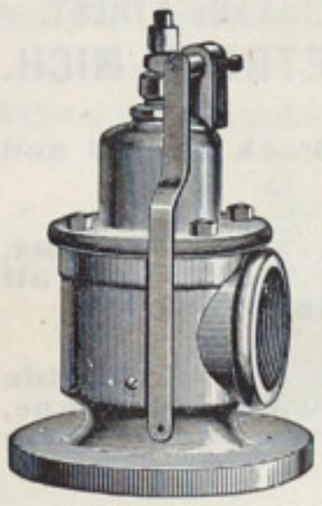

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